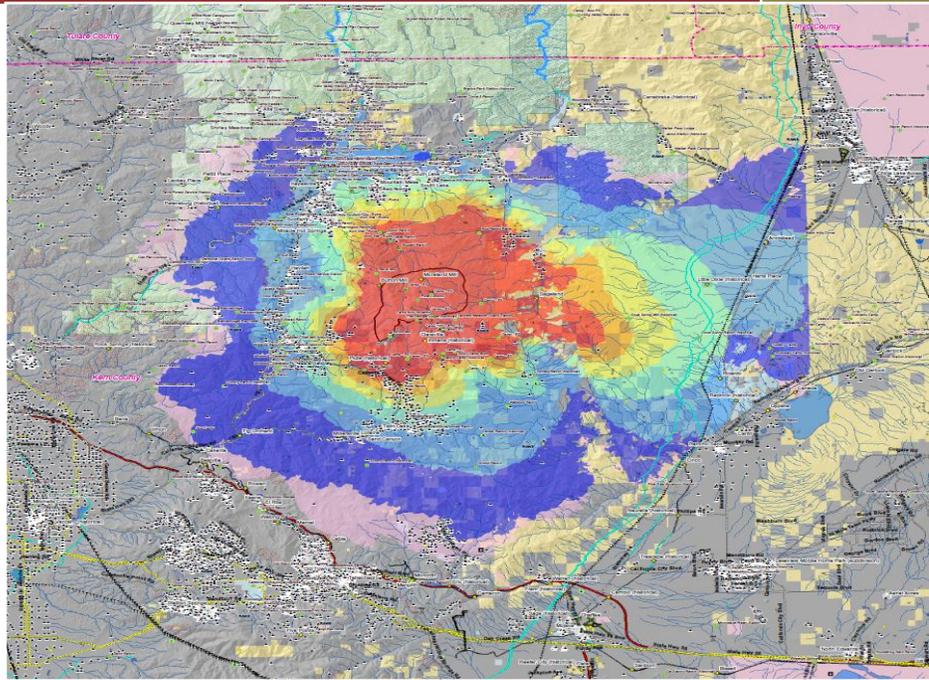


# 2011

## Rapid Assessment of Values at Risk RAVAR Analyst Manual



RAVAR Development Team

Rocky Mountain Research Station

24 June 2011

**RAVAR ANALYST MANUAL (v. 1.3: 24 June 2011)**

Written by Jeff Kaiden<sup>1</sup>, Jessica Haas<sup>2</sup>, Kevin Hyde<sup>3</sup>, and Jeremy Reinicke<sup>1</sup>

Edited and produced by Kevin Hyde<sup>3</sup>

RAVAR Development Team  
Fire Economics Unit  
Rocky Mountain Research Station (USFS)  
Missoula, MT, USA

**Citation:**

Kaiden, J., Haas, J., Hyde, K. and Reinicke, J., 2011. RAVAR Analyst Manual. K. Hyde, Editor.  
Rocky Mountain Research Station, Missoula, MT.

This manual is a work in progress. Should you find errors, inconsistencies, or confusing instructions please report your findings to Kevin Hyde ([kdhyde@fsf.fed.us](mailto:kdhyde@fsf.fed.us)) or Jeff Kaiden ([jkaiden@fs.fed.us](mailto:jkaiden@fs.fed.us)). We appreciate your patience and interest.

**“70% accurate is better than 100% late!”**

The wisdom of John Szymoniak

Thanks for the motivation to build RAVAR.

<sup>1</sup> University of Montana - College of Forestry & Conservation

<sup>2</sup> USDA Forest Service

<sup>3</sup> Collins Consulting

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## EXECUTIVE SUMMARY OF RAVAR

RAVAR is the primary fire economics tool within the Wildland Fire Decision Support System (WFDSS). RAVAR was developed by Dr. Dave Calkin and Kevin Hyde (Collins contractor) from the Rocky Mountain Research Station's Missoula Forestry Sciences Lab. RAVAR identifies the primary resource values threatened by ongoing large fire events. RAVAR is typically integrated with the FSPro model to identify the likelihood of different resources being impacted in the potential fire path of an ongoing event but can be linked to any expected fire spread polygon.

The RAVAR model produces two primary outputs. The Critical Infrastructure (CI) map and report identifies private structures, public infrastructure, public reserve areas, and hazardous waste sites. Natural and Cultural Resources (NCR) products focus on regionally identified natural resource and wildland management priorities. Private structures within the CI layer are based on two sources: county level geospatial cadastral data; and where cadastral data is unavailable, structure points derived from aerial photo interpretation produced by the USGS, Rocky Mountain Geographic Science Center. Acquisition of the cadastral data has been coordinated by the FGDC Cadastral Sub-Committee and resulted in the pre-staging of structures layers for use in the RAVAR for 70% of all western US counties in 2010. The cadastral committee has reached out to local county offices including assessors, planners, natural resources, and GIS staffs, to acquire the county's spatial (GIS) parcel records. From the cadastre record, a building clusters map is developed representing the general location of structures identified within the parcel records. Public infrastructure includes water supply systems and reservoirs, major power lines, pipelines, communication towers, recreation facilities, and other significant landmarks. CI also identifies designated wilderness and roadless areas, wild and scenic river corridors, and national recreation areas. Superfund sites and mines are mapped and reported along with other HAZMAT locations.

NCR reports are used to identify highly valued natural resources and management priorities that may be affected by an ongoing fire event. Examples of NCR layers include sensitive wildlife habitat, recreation zones, and restoration priority areas. Identification and acquisition of NCR data for use in RAVAR is best coordinated and implemented within each Geographic Area through direct interactions with fire management and natural resource staff members from all agencies.

RAVAR was initially tested in 2005 with increased testing and prototype applications delivered during the 2006 and 2007 season. During the active fire seasons of 2007 and 2008, over 100

RAVAR reports were delivered each year through the web-based Wildland Fire Decision Support System (WFDSS) to fire events in real time. The WFDSS was developed by the USDA Forest Service and is currently being adopted by Department of Interior agencies. RAVAR principles, select CI data, and modified analysis methods are incorporated into WFDSS through Values-at-Risk (WFDSS-VAR) summaries. On-going research seeks to produce recommendations for most effective use of WFDSS-VAR and for determining when full RAVAR analysis is advised.

RAVAR can help agency administrators, incident managers, and fire planners develop wildland fire suppression strategies by rapidly identifying and quantifying the significant resource values most likely to be threatened by an ongoing fire event. In the area command setting, RAVAR has been shown to be useful in prioritizing fires for assignment of scarce suppression resources. Additionally, RAVAR-type risk-based analysis is being implemented to inform fuel management decisions and post-fire emergency response.

## INTRODUCTION TO RAVAR ANALYSIS

The essential task of a RAVAR analyst is to rapidly map, interpret, and report values-at-risk from the probable spread of wildland fire; RAVAR analysis is not just a mapping exercise. It is your job to think through the spatial relationships between probable fire spread, the assets or valued resources potentially in the path of spreading fire, and the relative risk within and between different assets and resources.

RAVAR requires a combination of technical GIS and geographic analysis skills. The GIS portion requires basic skills, “spatial analysis 101” – accessing and synchronizing data sources, modifying legends and basic map elements, and so forth. You start with a template so little design skill is needed. The technical part requires attention to detail and making changes fast. The RAVAR Tool simply provides semi-automated summary of assets (points, lines, and polygons) by FSPRO zones (polygons). The greatest technical learning curve is the sheer number of steps required. With practice you will internalize the workflow and these steps will become automatic.

The basis of geographic analysis is, “Where is it? Why there? What of it?” What valued resources are in the path of modeled fire spread? How do the location, distribution, and quantity of valued resources vary within and between resources? The goal of geographic analysis is to build a RAVAR Report that is accurate, parsimonious, and uses clear language. You write assuming that your reader has precious little time to understand the map and report. Your summary focuses their thinking, guiding them to the key information on the map in the context of potential fire spread.

Who is your audience? How are the RAVAR products used? We are still learning the answers to these questions. The audience may include decision makers at all levels – members of incident management teams, resource advisors, line officers, and emergency managers from county and state officials to FEMA personnel in D.C. The products may inform political representatives from mayors, county managers, governors, and possibly the President of the United States (POTUS).

What benefits arise from RAVAR that merit the investment in your skills and time? As mentioned, the RAVAR Report focuses attention. The finished RAVAR Map is designed to be plotted at 34”x44” and easily shared with many decision makers. The vision of a paperless society aside, it’s been said that if fire folks do not have paper maps they will go outside the tent and draw in the dirt with sticks.

Beyond clear summary and enhanced communication we are still learning RAVAR applications and benefits. How do we most effectively conduct risk-based management? RAVAR is an innovative first step. Most simply, the RAVAR Map and Report put the threat – wildfire – in the context of values-at-risk. Discussion can move from “Oh, no! Wildfire!” to “We have a wildfire. So what?” What response is warranted given the probable spread and the values-at-risk?

Another perspective comes from a real event. Consider the historic and understandable emphasis placed on protecting private structures. Recognize that consistent mapping of approximate structure locations only became possible over the past few years with the method of deriving building clusters from county parcel data. Assigning protection resources involves trade-offs. Imagine a scenario where structures are threatened along a highway corridor and fire is rapidly advancing not toward the structures but toward a stand of rare, disease resistant pine. Once structures are clearly mapped and a protection plan implemented might the RAVAR Map help with the question, “Now, what can we do about protecting these rare trees?”

A word about information security and the responsible use of hazard forecast reports: Most RAVAR asset data comes from national, security-controlled sources. **We cannot share these data beyond authorized RAVAR analysts** without running the risk of compromising access to these data in the future. The products must only go to officials who understand what they are looking at, who understand that FSPro is a model, not a certain future of fire spread. Put yourself in the position of a homeowner totally unfamiliar with fire spread modeling. Imagine you see the little triangle representing your home and it is surrounded by a pink mask of potential fire spread. Folks familiar with FSPro know that color means “a less than 1% chance” of burn, the **modeled** extreme event – again – **modeled!** My house was once mapped in the pink zone. I know FSPro well and still that visual was unsettling. Simply put RAVAR products are posted to WFDSS and only get distributed to officials **for Official Use Only**.

Welcome to RAVAR. We have designed this manual to provide step by step guidance as you learn to conduct RAVAR analyses. Please share your experience with us. We expect the manual and the processes can be improved and we are keen to better understand the role of RAVAR in risk-based management.

Kevin Hyde  
Missoula, MT  
9 July 2010

# RAVAR COMPUTER SET-UP 2011

## *ENSURE ADMINISTRATIVE PRIVILEGES ARE GRANTED ON COMPUTER*

Set-up should be a one –time task

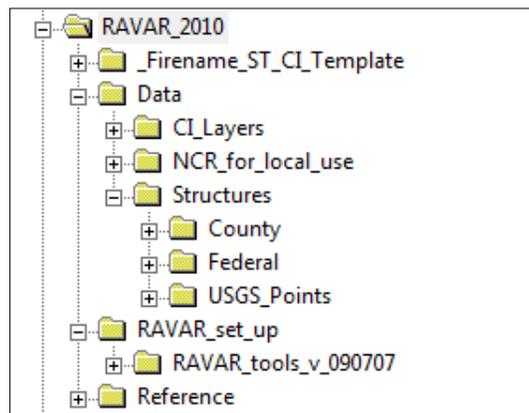
### Confirm and create RAVAR folder structure:

1. Confirm C:\RAVAR\_YYYY folder, i.e. RAVAR\_2011

**(Note:** The core file structure with reference and template files included is generally provided as a .zip file through access to RAVAR training materials. Users' should expect to unzip the folder as is and **not** to need to create or change this structure.)

**(Note:** This directory may be created in any location provided the path and naming conventions comply with ArcGIS functionality.)

This Source Directory is where all **RAVAR data** and **blank templates** reside.

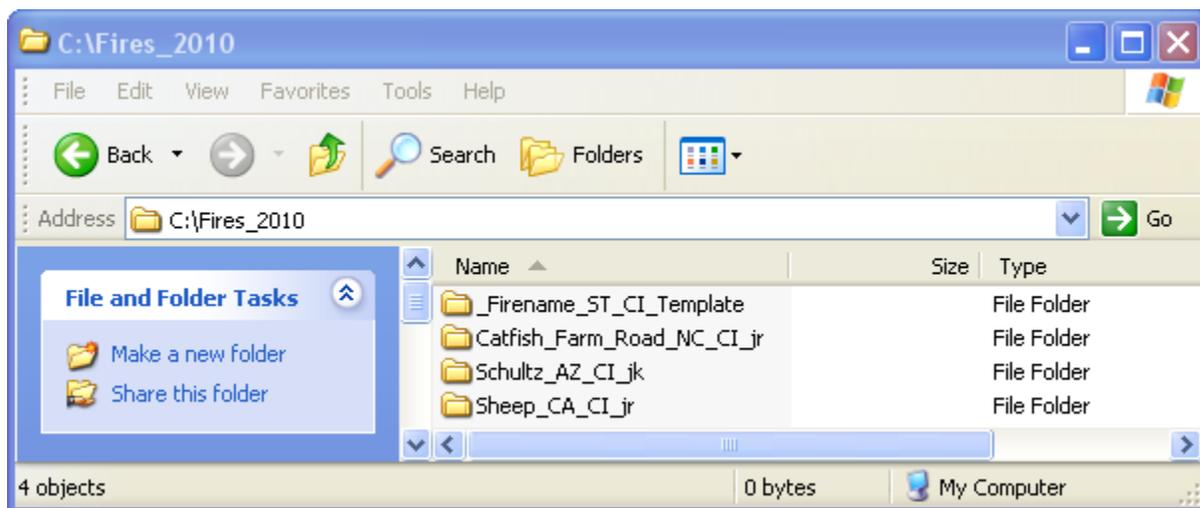


The sub-folder structure is:

- a. **\_Firename\_ST\_CI\_Template** folder which contains
  - Blank templates – Basis for all RAVAR analyses.
  - **Note:** This sub-folder serves as a backup to the working directory (Fires\_YYYY folder).
- b. **Data** folder which contains
  - **CI\_Layers** – Critical Infrastructure and geographic base data, generally from nationally consistent sources (**Note:** Each regional analyst populates the **Data\CI\_Layers** per their locale. Consult NFDSC for access to current RAVAR CI data)

- **NCR\_for\_local\_use** – Natural and Cultural Resources data for advanced and locally specific analysis RAVAR analysis (**Note:** NCR data are generally under development and may not be available in your area. It is expected that development of NCR data will be completed locally and coordinated within each Geographic Area.)
  - **Structures** – structure location points separated by
    - **County** – Building cluster points derived from parcel data
    - **Federal** – US Forest Service from INFRA (Note: Completeness of data uncertain, National Park Service, and Bureau of Land Management)
    - **USGS\_Points** – Structures found by analyzing aerial photographs to supplement counties lacking parcel data
- c. **RAVAR\_set\_up** folder which contains
- RAVAR Palette style file
  - Files needed to run the RAVAR Tool in Arc GIS, including python libraries.
- d. **Reference** folder which contains
- RAVAR Analyst Manual
  - Cadastral Availability table
  - UTM and geographic area reference maps
  - County Average Housing Value per US Census
2. Create C:\Fires\_YYYY folder, i.e. Fires\_2011

This is the Working Directory for RAVAR analyses where each RAVAR fire analysis will have its own folder. (**Note:** This directory may be created in any location provided the path and naming conventions comply with ArcGIS functionality.)

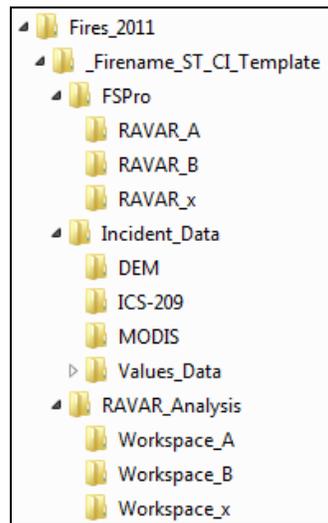


- a. Once you have created the Fires\_YYYY root, copy C:\RAVAR\_YYYY\\_Firename\_ST\_CI\_Template folder to the newly created C:\Fires\_YYYY folder as depicted above.

At the start of the first RAVAR for a fire incident this template folder is copied and renamed

- Naming Convention: <FireName\_State\_CI\_AuthorsInitials>
  - CI stands for Critical Infrastructure
  - Sample Name: “Bingo\_MT\_CI\_kh”

The **\_Firename\_ST\_CI\_Template** folder is structured as follows:



- b. This template folder contains template files, storage folders for routine analysis data and outputs, and files required to run the RAVAR Tool
- i. File: **firename\_ST\_CI\_A\_YYYYMMDD\_ai\_map.mxd** – This is the base ArcGIS 9.3 map template. It is renamed at the start of a new incident requiring RAVAR Analysis incident  
 e.g. “Bingo\_MT\_CI\_A\_20100710\_kh\_map.mxd” where “A” equals RAVAR run (A, B, C, etc.) for the incident
  - ii. Folder: **\FSPRO** folder – Use this folder to store the FSPRO shapefiles downloaded from WFDSS by RAVAR run (A, B, C, etc.). These shapefiles include the FSPRO output file, ignition file, and barrier file (if present)
  - iii. Folder: **\Incident\_Data** – Use this folder to store all incident specific, non-values data used in the analysis
    1. Folder: **\DEM** - DEM and derived Hillshade data.
    2. Folder: **\ICS-209** – FAM-WEB 209 reports, daily incident status summaries
    3. Folder: **\MODIS** - MODIS fire detection data

4. Folder: **\Values\_Data** – store any additional (local or incident specific values data (Note: This folder is rarely used but handy to have available when needed)
- iv. Folder: **\RAVAR\_Analysis** – this folder contains the RAVAR Report .doc template and the “\Workspace” folder required for the RAVAR Tool. Final maps and reports are stored in \RAVAR\_Analysis.

The initial contents of \RAVAR\_Analysis are:

1. File: **FireName\_ST\_CI\_A\_YYYYMMDD\_ai\_doc.doc** – This is the base Word document template. Like the .mxd, it is renamed at the start of a new incident requiring RAVAR Analysis incident. (Note: We typically copy and paste the lead name string of the new .mxd name to rename the working report file.)  
e.g. “Bingo\_MT\_CI\_A\_20100710\_kh\_doc.doc” where “A” equals RAVAR run (A, B, C, etc.) for the incident
2. Folder: **\Workspace\_(A, B, C, etc)** – This folder and contents are required for the ArcGIS RAVAR Tool. The user should not need to make changes to this folder or its contents.

#### Install Google Earth (Recommended):

1. Open Internet Explorer and navigate to <http://earth.google.com/>
2. Click on the “Download Google Earth” button in upper-right
3. Click on the “Agree and download” button
4. Wait for the program to install

*\*\*\* Note the most current version of Google Earth (5.x) needs Internet Explorer 7.x to run. If your computer only has Internet Explorer 6.x or lower, you must get an earlier version of Google Earth.*

#### Configure PYTHON Libraries

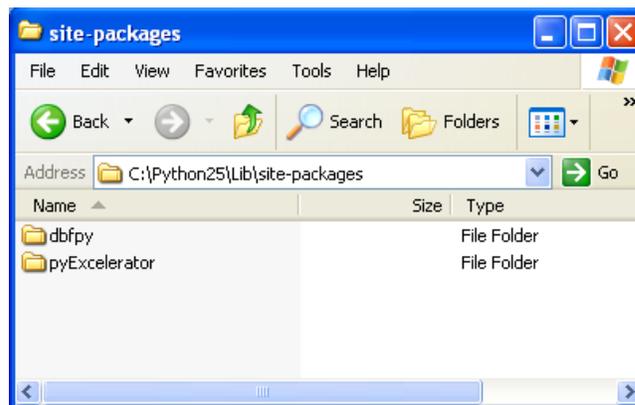
1. Copy the **\dbfpy** and **\pyExcelerator** library folders from ‘C:\RAVAR\_YYYY\RAVAR\_set\_up\RAVAR\_tools\_v\_090707\PYTHON\_LIBS’ into ‘C:\Python2#\Lib\site-packages\’ directory (Note: Use most recent version of PYTHON, i.e. Highest number\*\*, e.g. \C:\Python25)

(Note: These files they can be downloaded at:  
<http://sourceforge.net/projects/pyexcelerator/> &  
<http://sourceforge.net/projects/dbfpy/>

**NOTE:** PYTHON is simply the coding language used to create the RAVAR Tool. These PYTHON library folders MUST be installed as directed above for RAVAR Tools to function. The PYTHON program calls from ArcGIS to these libraries are static, looking for libraries in this specific location.

**NOTE:** If you choose to download the most recent version of these python folders, be careful to mimic the directory displayed below. For instance, the current download is named "pyExcelearot-0.6.4.1." Within that folder, is a folder named "pyExcelearator"; copy and paste this folder into the 'site-packages' directory directly.

2. Your site-packages folder should look like this, with perhaps more folders than those shown below:



*\*\*NOTE: use appropriate python version based on your version of ArcGIS; 9.2 uses Python 2.4; 9.3 uses Python 2.5; 10 uses Python 2.6. PYTHON allows multiple versions to be installed at once, so your computer may have more than one PYTHON version on it, please ensure that you have installed the site packages into the correct (highest number) PYTHON version folder.*

### Install LANDFIRE Data Access Tool (Recommended)

1. Be sure all ESRI applications are closed
2. Go to the National Interagency Fuels Technology Team web site:  
<http://frames.nbii.gov/nifft/resources/>
3. Find the link for your ArcMap version.



4. Download to C:\RAVAR\_YYYY\LANDFIRE (Create this new folder during 'unzip' process)

5. Navigate to C:\RAVAR\_YYYY\LANDFIRE and complete setup routine (setup.exe)
6. Open ArcMap, navigate to menu → View → Toolbars → click to active the LANDFIRE Data Access Tool for ArcGIS 9.2/9.3 or 10

*NOTE: I have found that leaving the LFDAT toolbar on while working within ArcMap can cause issues; I only turn this tool on as I use it, then when I have finished with it, I turn it back off*

## Customize ArcGIS

### 1. Copy RAVAR Palette

- a. Copy and paste (in Windows Explorer) “RAVAR Palette” from ‘C:\RAVAR\_YYYY\RAVAR\_set\_up\RAVAR Palette.style’ to ‘C:\Program Files\ArcGIS\Styles’.

(Note: For 64-bit operating systems, paste to C:\Program Files (x86)\ArcGIS\Styles’

- b. From the main menu within ArcMap: Tools/Styles/Style Reference
- c. In the **Style Reference** dialog box, scroll down to “RAVAR Palette” and click the box in front of it.

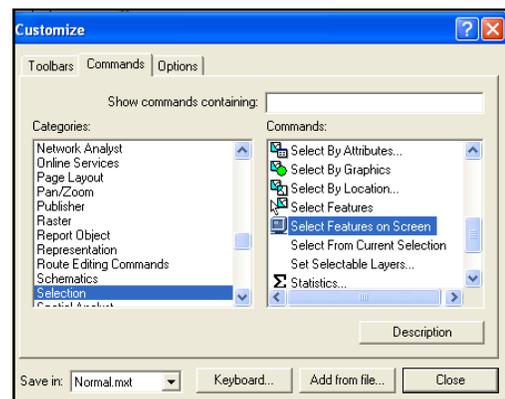
### 2. Set up useful Buttons/Toolbars

A couple buttons & toolbars commonly used in RAVAR are not active by default when ArcGIS opens. You can access these buttons from main menu:

- a. **Select Features on Screen** tool:

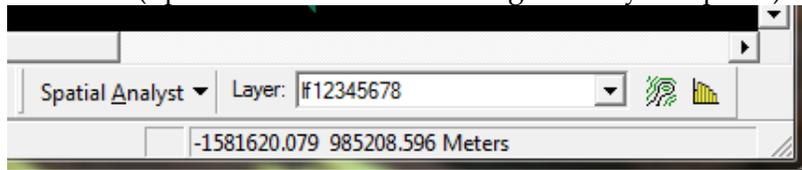
From the main menu, click on **Tools/Customize**. Arc10.x users will need to navigate the main

menu **Customize → Customize Mode...** Then click on the ‘**Commands**’ tab. Choose ‘**Selection**’ in the ‘**Categories**’ box on left; click the ‘**Select Features on Screen**’ from the ‘**Commands**’ box on right and drag the icon to an ArcMap toolbar where you want this tool to reside)



**b. Spatial Analyst toolbar:**

- i. To enable the Spatial Analyst extension: From the main menu, click on **Tools/Extensions**. Select the '**Spatial Analyst**' extension.
- ii. To display the Spatial Analyst toolbar: From the main menu, click on the **View/Toolbars**. Scroll down and select '**Spatial Analyst**.' You can move this toolbar to wherever you desire in the ArcMap interface. (I placed it into the bottom right on my computer)



- iii. Arc 10.x users: you will need to add the hillshade tool from the [Customize tab](#) similar to the '**Select Features on Screen**' tool selection in section 2a above.
  1. From ArcMap menu: **Customize** → **Customize Mode...**
  2. From Customize pop-up box: **Commands** tab →  
Category: **Spatial Analyst Tools** → Command: **Hillshade**

**3. Load RAVAR Tool into ArcToolbox**

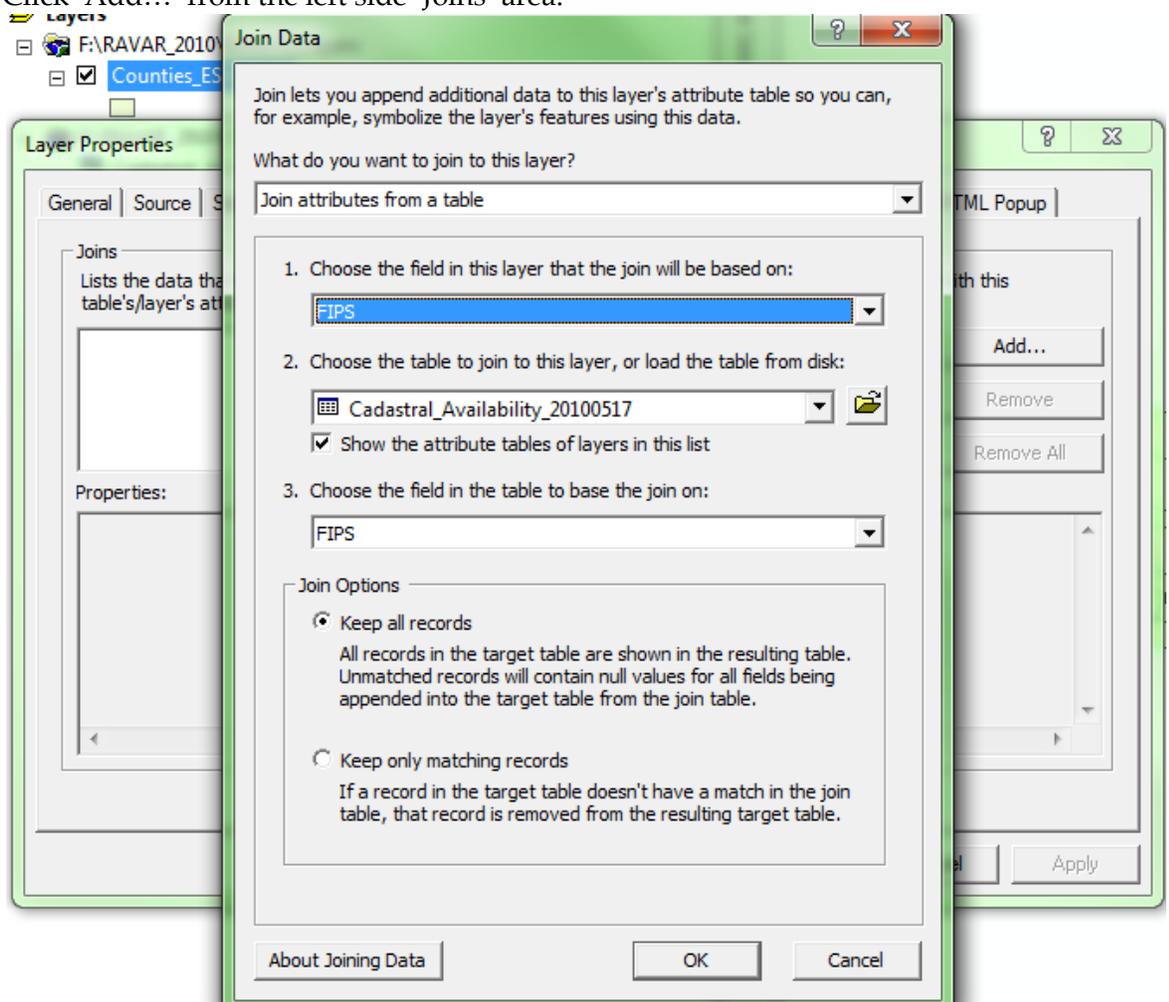
- a. Open ArcToolbox 
- b. Right click within the ArcToolbox list of tools, but not on any tool, in the blank space, to get a pop-up menu to appear. Choose 'Add Toolbox...' from pop-up menu and navigate and select the RAVAR tool:  
Right-Click in empty space of ArcToolbox → Add Toolbox →  
C:\RAVAR\_YYYY\RAVAR\_set\_up\RAVAR\_tools\_v\_090707\RAVAR\_a  
rctool → RAVAR (Select this box and choose open; do not actually open it  
for you will find nothing within it, at this stage)
- c. Once the toolbox is loaded you can right click the ArcToolbox Table of Contents and select  
Save Settings → To Default

Now the RAVAR toolbox should load every time you open ArcMap (Note: Some users report this feature is unstable – you may need to load the RAVAR Tool each time you open need to use it.)

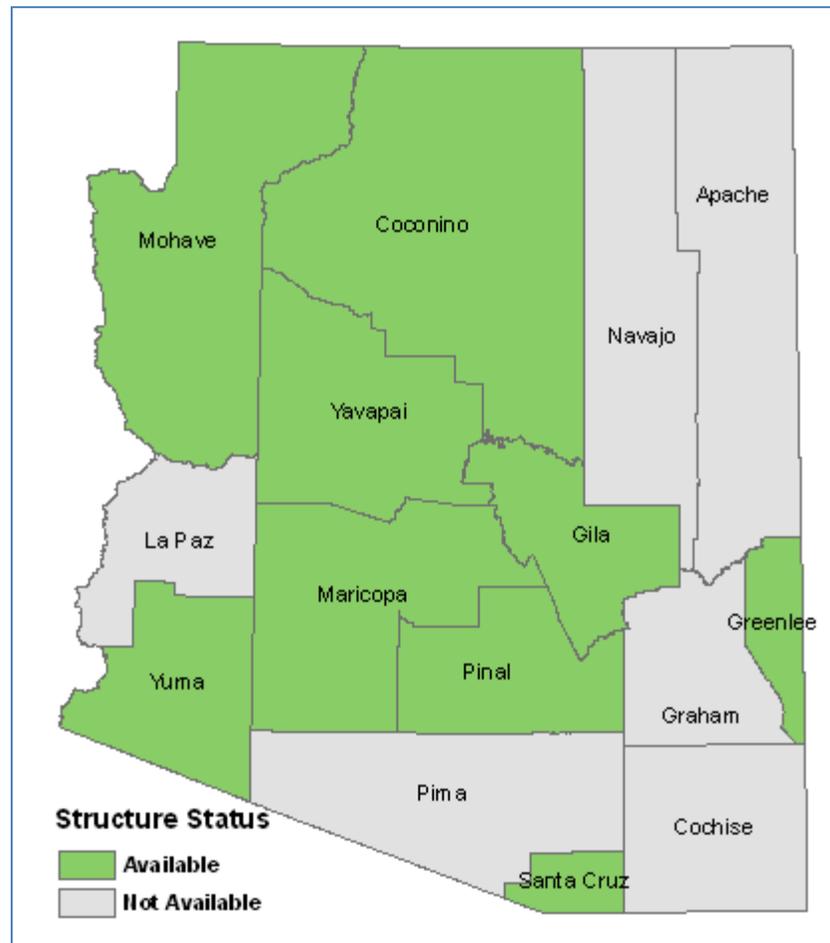
*NOTE: You may want to save the blank template at this stage as your new RAVAR template so that all of the customizations remain in future RAVARs; especially if you placed your RAVAR\_YYYY and/or your Fires\_YYYY folders somewhere else than the root of the C:\ (as our templates assume...) Repair the broken data layers (only the data layers that are the same for all RAVARs) and then save out the template so you do not have to repeat for each RAVAR.*

## Other Essential (Non-computer) Preparation Steps:

1. Register for WFDSS Access
  - a. Go to [http://wfdss.usgs.gov/wfdss/WFDSS\\_Home.shtml](http://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml) to Request Account.
2. Register for FAMWEB 209 Access
  - a. Go to <http://fam.nwcg.gov/fam-web/> to initiate a "FAMWEB Logon Request"
3. Prepare rapid reference map and table for County Structure Availability
  - a. Use file located at: C:\RAVAR\_YYYY\Reference\Cadastral\_Availability\_versiondate.dbf to link to county GIS layer and create a working County Structure Availability map for your area
  - b. You will need the above \*.dbf and the Counties data layer from 'RAVAR\_YYYY\Data\CI\_Layers' folder loaded into ArcMap.
  - c. Open the County 'Layer Properties' and choose the 'Joins & Relates' tab.
  - d. Click 'Add...' from the left side 'Joins' area.



- e. Ensure you 'Join attributes from a table' using the 'FIPS' field for both the County data (1) and the Cadastral data (3).
- f. Enter the 'Symbology' tab; Choose the "Unique Values" under "Categories" within the "Show" box. Select the "Value Field" as "AVAILABLE" and 'Add All Values'



Example of rapid reference County Structure Availability map for Arizona

## COMPLETING A RAVAR ANALYSIS

*Recommendation: Start each RAVAR analysis with a fresh notepad or notebook page open in front of you. Take detailed notes throughout the process... also practice good GIS and document management skills and SAVE OFTEN!*

### Confirm RAVAR Request and Assess Situation

1. Review Incident Information on WFDSS
  - a. Log in to WFDSS, locate incident by FSPro status
  - b. Review available RAVAR-relevant information on the site
 

(**Note:** Analysts are strongly encouraged to become very familiar with the layout and functionality of WFDSS including locating incidents, using the filter controls, accessing FSPro results, and viewing; the amount of data available on the site is always expanding with each successive update, but focus on the RAVAR-relevant information that would be valuable to those in the field who use the RAVAR report and map to assist them making more informed fire management decisions)
2. Contact person requesting RAVAR, confirm status of FSPro, ask about any special needs, considerations, values-at-risk, and RAVAR delivery schedule
3. Once situation and need are verified, locate RAVAR request for incident and "Accept"
4. Confirm county or counties potentially threatened by the fire; check for availability of structure points; if structure points are not available for any or all of the counties affected initiate USGS Structure Request immediately through the NFSDC.
5. Consult paper maps, Google Earth, and other relevant resources to familiarize you with the location and geographic context of the fire *before* going to GIS.

### Prepare and Collect Incident Data for RAVAR Analysis

+++ Recall that core CI data – geographic base layers and critical asset data – are loaded into C:\RAVAR\_YYYY\Data\CI\_Layers during the Computer Set-up procedures.

#### 1. Create incident project directory:

Copy & rename the C:\Fires\_YYYY\\_Firename\_ST\_CI\_Template directory following the protocols:

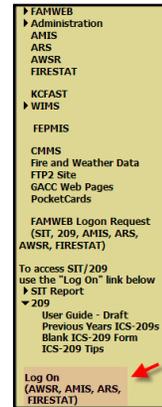
C:\Fires\_YYYY\[Fire\_Name]\_[state]\_[level]\_[analyst\_initials]

Example: Jesusita\_CA\_CI\_jh

2. Gather and download information Needed to Run a RAVAR Assessment

a. Collect current ICS-209 Document

- i. Download ICS-209 documents at <http://fam.nwcg.gov/fam-web/>. You will need to logon by clicking the 'Log On' hotspot on the left-hand side menu, near the bottom.
- ii. Click on 209 (left-hand side menu) → Reports → select the fire name under its Region box → Press the Region box to load up the reports for the chosen fire.
- iii. Save locally to: C:\Fires\_YYYY\[your\_fire\_folder] → Incident\_Data → ICS-209 folder



1. Write down the key incident information:

Incident Status Summary (ICS-209)						
1: Date 08/10/2009	2: Time 0600	3: Initial   Update   Final XX		4: Incident Number CA-LPF-002631	5: Incident Name LA BREA	
6: Incident Kind Wildland Fire (Full Suppression/Perimeter Control)		7: Start Date Time 08/08/2009 1450	8: Cause Under Investigation	9: Incident Commander DANA D'ANDREA	10: Incident Command Organization Type 3 IC	11: State-Unit CA-LPF
12: County SANTA BARBARA		13: Latitude and Longitude Lat: 34° 57' 0" Long: 119° 58' 39" Ownership: CA-LPF		14: Short Location Description (in reference to nearest town): 21 MILES EAST OF SANTA MARIA		
15: Size/Area Involved 10,500 ACRES	16: % Contained or MMA 0 Percent	17: Expected Containment Date:		18: Line to Build 21 Miles	19: Estimated Costs to Date	20: Declared Controlled Date: Time:
21: Injuries this Reporting Period: 0	22: Injuries to Date: 0	23: Fatalities 0	24: Structure Information			
			Type of Structure	# Threatened	# Damaged	# Destroyed
25: Threat to Human Life/Safety: Evacuation(s) in progress ---- No evacuation(s) imminent -- Potential future threat ----- XX No likely threat -----			Residence			
			Commercial Property			
			Outbuilding/Other			
26: Projected incident movement/spread 12, 24, 48, and 72 hour time frames: 12 hours: Little fire spread due to high relative humidities. 24 hours: Fire is expected spread significantly due to warmer and dryer weather. 48 hours: 72 hours:						
27: Values at Risk: include communities, critical infrastructure, natural and cultural resources in 12, 24, 48 and 72 hour time frames: 12 hours: San Rafael Wilderness, Campgrounds, Cultural Resources, Sisquoc Watershed 24 hours: San Rafael Wilderness, Campgrounds, Cultural Resources, Sisquoc Watershed 48 hours: San Rafael Wilderness, Campgrounds, Cultural Resources, Sisquoc Watershed 72 hours: San Rafael Wilderness, Campgrounds, Cultural Resources, Sisquoc Watershed						

Red boxes indicate 209 information that should be jotted down for reference while building the map and report: Incident Number, County, Structure Information, Values-at-Risk.

**NOTE:** During the RAVAR analysis Values-at-Risk reported in the 209 Report will be spatially verified and quantified relative to predicted fire spread.

- b. Gather FSPro model parameter information
  - i. Return to WFDSS and click on 'Analyses' tab
  - ii. Scroll to and check radio button by the incident FSPro run indicated by the FSPro Analyst:
  - iii. Record the *Analysis Name*, the (*FSPro*) *Analyst's* name, and the *Requested date*.



Willand Fire Decision Support System National Preparedness Level: 2 Kevin Hyde on Production | Sign out

My Home Incidents **Analyses** Intelligence Data Management Help Feedback

Analysis List Filter  
Filters: Temporary Define Temporary Filter Edit Filter List

Analysis List  
Generate KML for Completed FSPro Analyses Set Analysis List Preferences  
View Information View Results View Report Set Priority...

Incident / Analysis Name	Type	Geographic Area	Status	Pri	Owner	Analyst	Requested (CDT)	Completed (CDT)
<input type="radio"/> BRUSHY / run1	STFB	Southwest	Complete	7	Edwards, William	Opperman, Tonja	06/23/2010 23:52	06/25/2010 23:45
<input type="radio"/> BRUSHY / 7 Day 0625 512 Fires	FSPro	Southwest	Complete	7	Edwards, William	Ziel, Robert	06/25/2010 23:06	06/25/2010 23:34
<input type="radio"/> COTTONWOOD / Test	STFB*	Southwest	Complete	7	Group Ownership	Stetson, Chris	06/25/2010 14:39	06/25/2010 14:41
<input type="radio"/> 3.10 Test / Test ArcGIS Server	STFB	Rocky Mountain	Complete	7	Fiedler, Hans	Fiedler, Hans	06/25/2010 12:22	06/25/2010 12:51
<input type="radio"/> Schultz / 0625_Perim_Bar_IRIgn	FSPro	Southwest	Complete	7	Group Ownership	Beery, Robb	06/25/2010 10:33	06/25/2010 15:19
<input type="radio"/> BRUSHY / run1	Basic	Southwest	Complete	7	Edwards, William	Opperman, Tonja	06/24/2010 22:46	06/25/2010 23:46
<input type="radio"/> BRUSHY / run2_7days_500fires_RR	FSPro	Southwest	Rejected	7	Edwards, William	Opperman, Tonja	06/24/2010 20:49	07/01/2010 15:05
<input type="radio"/> South Fork / Brn Periods to Oso W/ Corrcr Ignitn	STFB	Southwest	Complete	7	Group Ownership	Thornton, Bruce Walker	06/23/2010 18:38	06/24/2010 18:35
<input checked="" type="radio"/> Schultz / 14d_2000f_LFRWEdt_2010_06_23MFprm_Flagwx2	FSPro	Southwest	Complete	7	Group Ownership	Umphries, Tara	06/23/2010 18:20	06/24/2010 08:52
<input type="radio"/> Long Canyon / Long Cnyn 1 (UA)	STFB*	Southwest	Complete	7	Bumgarner, Steven	Elenz, Lisa	06/23/2010 14:03	06/23/2010 14:09
<input type="radio"/> Schultz / RAVAR A	RAVAR	Southwest	Complete	7	Group Ownership	Kaiden, Jeff	06/23/2010 10:47	06/30/2010 16:48
<input type="radio"/> South Fork / Oso Canyon	STFB	Southwest	Rejected	7	Group Ownership	Thornton, Bruce Walker	06/23/2010 07:28	06/28/2010 22:03

- iv. Click the dark blue 'View Results' button → light blue 'Results' tab → 'Analysis Detail' & record **Analysis Start** date, and **Burn Duration**.

*Tip: Define a temporary filter to limit the analysis list to specific parameters (i.e. fires occurring in an individual Geographic Area, or to list all analyses for a specific incident). This option is located near the top within the 'Analysis List Filter' section.*



My Home Incidents **Analyses**

Menu Map Info Results

Fire Size (acres)

Average Size	4,690
90th Percentile	13,732
70th Percentile	4,232
50th Percentile	1,350
30th Percentile	434
10th Percentile	216
Largest Fire	65,244

Histogram

Analysis Details

Incident Latitude	Longitude
46.0228	114.2336
Analysis Start	Burn Duration
9/16/03	14 days
Simulations	
1024 fires	
Details	Values at Risk

Downloads

- c. Download FSPro run and output GIS files
  - i. Also located within the “Results” window, click on the blue ‘Downloads’ drop-down menu. One at a time select and download:
    1. Output (meters)
    2. Ignition (meters )
    3. Barrier (meters) *(if available – Barriers are not used for all FSPro runs)*



*NOTE: The degrees shapefiles to download will work in ArcMap correctly; however, they will cause the python RAVAR analysis tool to crash. These shapefiles need to be in an equal-area projection to calculate area correctly. The python code is hard-coded to project from the meters output to the USA Contiguous Albers Equal Area Conic Projection used with all data in the RAVAR*

- ii. Save all FSPro files to: **C:\Fires\_YYYY\[your\_fire\_folder]\FSPro\RAVAR\_A** (or to next folder in sequence for repeat RAVAR analysis later for same fire)
- d. Download current MODIS hotspots (Recommended to provide context for the active and recent burn. Local IR may be substituted if available.)
  - i. Go to: <http://activefiremaps.fs.fed.us/>
  - ii. Click on the ‘Fire Detection GIS Data’ on left-hand side menu.
  - iii. Click on ‘Fire Detection for the last 7 days’ link.
  - iv. Click on link to “<http:... conus\_shapefile.zip
  - v. Download/unzip/save to:  
**C:\Fires\_YYYY\[your\_fire\_folder]\Incident\_Data\MODIS** folder
  - vi. Append the unzip file name to include most recent timestamp on the MODIS Active Fire Detections for CONUS download page (i.e. 20100702\_1600h\_modis\_fire\_last7\_2010\_183\_conus\_shapefile.zip)

**Title:**

MODIS Active Fire Detections for the CONUS - 06/25/2010 through 07/02/2010 1600 MDT

**Geospatial\_Data\_Presentation\_Form:** vector digital data**Publication\_Information:****Publication\_Place:** Salt Lake City**Online\_Linkage:**[http://activefiremaps.fs.fed.us/data/fireptdata/modis\\_fire\\_last7\\_2010\\_183\\_conus.e00.gz](http://activefiremaps.fs.fed.us/data/fireptdata/modis_fire_last7_2010_183_conus.e00.gz)[http://activefiremaps.fs.fed.us/data/fireptdata/modis\\_fire\\_last7\\_2010\\_183\\_conus\\_shapefile.zip](http://activefiremaps.fs.fed.us/data/fireptdata/modis_fire_last7_2010_183_conus_shapefile.zip)

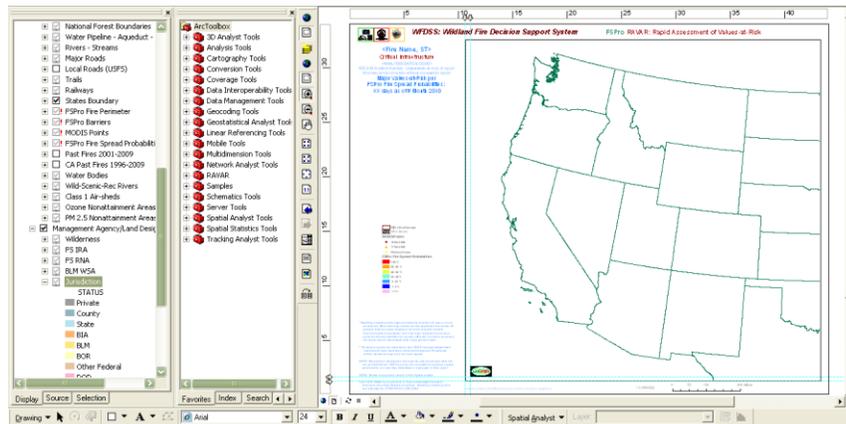
Screen capture of MODIS download page showing shapefile hyperlink and time of last update.

## Create RAVAR CRITICAL INFRASTRUCTURE Map (ArcGIS)

### 1. Rename the ArcGIS Map Template

\_Firename\_ST\_CI\_A\_YYYYMMDD\_ai\_map.mxd as *FireName\_State\_Level\_Run\_Date (YYYYMMDD)\_Analyst Initials\_map.mxd* & Open it.  
(Example: Schultz\_AZ\_CI\_A\_20100624\_jk\_map.mxd)

- Level: CI or NCR (Critical Infrastructure, Natural & Cultural Resources)
- Run: A for initial RAVAR run, B, C etc. for each additional run



The RAVAR template .mxd opens focused on the Western US. Scale controls are set to permit display of state boundaries only. Advanced analysts may choose to refocus and save their RAVAR template to open to their primary area of concern.

### 2. Repair Broken Data Sources

- Repair data sources for FSPRO fire perimeter, FSPRO Barrier & FSPRO spread probabilities (source to shapefiles downloaded above)
- Other layers' data source can be repaired by going to, C:\RAVAR\_YYYY\CI\_Layers & choosing the appropriate .shp file

*Tip: "Right-clicking" a broken layer & using the **data** → **repair data source** will re-source all layers found in the same folder*

**Note:** While we have generally found re-sourcing necessary, you may be able set relative path controls and get sourcing to stick

### 3. Repair FSPRO polygon geometry

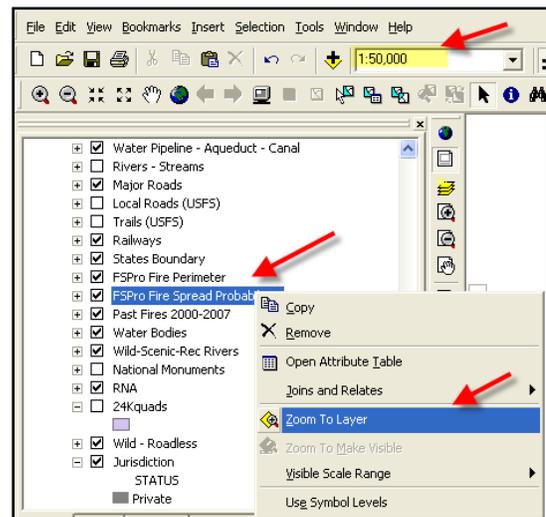
- Open ArcToolbox & locate the 'Repair Geometry' tool: Data Management Tools → Features → Repair Geometry
- Repair each of the (two or) three FSPRO shapefiles downloaded from the WFDSS website ('FSPRO Fire Perimeter', 'FSPRO Spread Probabilities', 'FSPRO Barrier')

**Note:** The topology of shapefiles downloaded from WFDSS occasionally are not closed, causing a 'leaking polygon' where the symbology will overrun the map image. Although, the RAVAR tool is programmed to automatically repair the WFDSS FSPRO Output (Spread Probabilities), it does not repair the fire perimeter nor barrier files. 'Leaking polygons' will not affect analysis results, only the map display.

**4. Focus Map on Area of Concern**

Center and proportion the FSPRO Spread Probabilities output to the center 35-45% of the layout

- a. Use at least 1:30,000
- b. Use scales rounded to the nearest 5,000
- c. Good time to Save progress



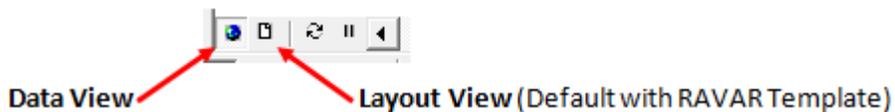
**5. Download Elevation Data**

The purpose of downloading the elevation (DEM) data is to convert it to a hillshade to aid the end-user read and interpret the map and relate it to the on-the-ground situation. There are multiple ways to achieve this goal. We have found the LFDAT tool to be very helpful; remember it will only work in 'Data View.'



Use LFDAT extension to get LANDFIRE **elevation** data for the area of the layout.

- a. Zoom out beyond the final extent to be published to ensure the entire displayed extent will have DEM data.
- b. Verify that the GIS display in is **DATA VIEW** (Note: the LFDAT will not work in layout view, although the menu will pop-up and appears to work, but will find no data). At the bottom left-hand corner of the ArcMap map window are buttons:

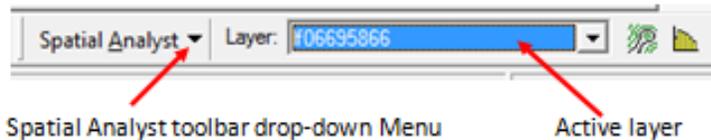


- c. Click on the LFDAT icon and draw a box around the entire mapped extent (that will be in the final product).

- d. Choose elevation data (AK Elevation for Alaska, CONUS Elevation for the Continental United States, although these labels are subject to changes).
- e. Save and Unzip the DEM into:  
C:\Fires\_YYYY\[your\_fire\_folder]\Incident\_Data\DEM

- i. Create a hillshade from the DEM (Spatial Analyst extension)

1. Add the downloaded DEM into ArcMap
2. Ensure the newly added DEM file is the active layer in the Spatial Analyst Toolbar



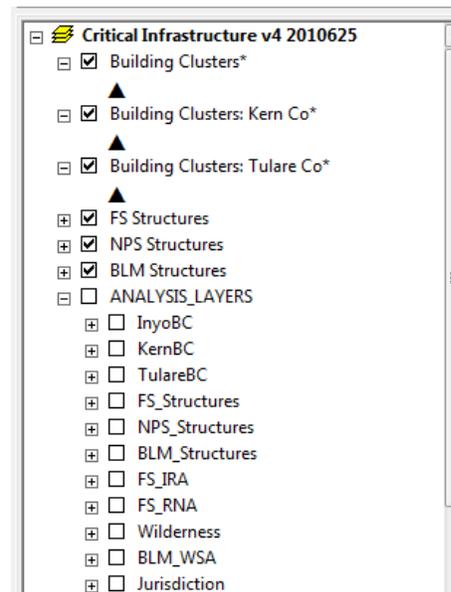
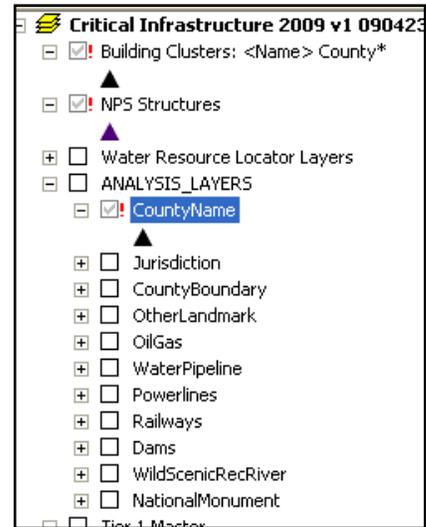
3. Click on the drop-down menu within the Spatial Analyst toolbar, choose: Surface Analysis → Hillshade...
  - a. ArcGIS 10.x users: you will need to add the hillshade tool from the [Customize tab](#); Category: Spatial Analyst Tools, command: Hillshade.
4. Modify the Output raster to save as:  
C:\Fires\_YYYY\[your\_fire\_folder]\Incident\_Data\DEM\Hillshade
5. Click OK; you do not need to change any setting, just adjust the save location to be in your fire folder.

- ii. Repair hillshade data source to newly created hillshade (makes the hillshade transparent)

1. ArcMap will probably add the newly created hillshade to the Table of Contents. Remove both the new hillshade and the DEM from ArcMap.
  2. Repair broken Hillshade from default template to the save location in your fire folder structure. (\Incident\_Data\DEM\ )
    - a. This allows the hillshade to be represented with the default template settings including transparency of 60%.
- f. If you haven't yet, return GIS map display to **Layout View** and turn off your LFDAT extension.

6. Re-source building cluster data for each county in the RAVAR analysis

- a. Identify the county or counties\*\* that intersect and/or are proximate to the FSPro output. This can be accomplished by various methods including a visual inspection, using the 'identity' tool in the toolbox, and/or using the 'select features on screen' command.
- b. If there are more than one county, copy and paste the building clusters layers: <County name> layer & the CountyName layer (ANALYSIS\_LAYERS) so you have one Building Cluster layer for each county
- c. Rename <Name> and CountyName to correspond to the counties that are in the analysis area (In ANALYSIS\_LAYERS group: Do **not** use spaces in a layer name because such names will not be read by the RAVAR Tool.) If multiple structure shapefiles exist for a desired county, choose the most recent data.



**\*\*Note:** If building cluster points do not exist for a given county, initiate a Structure Point Assist Request to USGS. **CONTACT the NFDSC/RAVAR group in Boise/Missoula to coordinate that process.**  
*Specific details pending*

- d. Repair/re-source the source of the county structure data from each respective county's 'Building Clusters: <Name> County\*' and '\ANALYSIS\_LAYERS\CountyName' to C:\RAVAR\_YYYY\Data\Structures\

NOTE: About the ANALYSIS\_LAYERS layer group – This is the group of layers that are analyzed using the RAVAR Tool. The group should remain 'turned off', the square next to the name left blank.

NOTE: The first County <Name> was left blank so that only one "Building Clusters\*" appears in the legend; don't need to differentiate the various counties' Building Clusters when all use the same symbology.

(SAVE PROGRESS)

## 7. USGS Structure Request (if necessary)

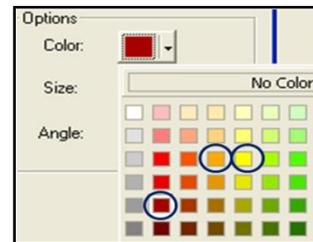
- a. Determine which counties lack structure data; this can be accomplished in various methods including a visual inspection, using the 'identity' tool in the toolbox, and/or using the 'select features on screen' command.
- b. Turn on the 'USGS Reference' group at the bottom of the ArcMap Table of Contents by clicking in the box to the left of the group name. You may also want to drag the group to the top of the Arc Table of Contents to place these datasets above the other datasets to see them more clearly in the map portion.
- c. Turn on both datasets in the 'USGS Reference' group by clicking in the box to the left of those dataset names ('USGS Structure Quadrangle Completed Inventory' and '24K quads').
- d. If a USGS structure request has already been completed for the area of concern, those quads should be symbolized with a filled-in quadrangle covering the specific quadrangles where that structure request was completed.
  - i. The age and source of the imagery used to perform the structure search should be listed in the attribute data of the Completed Inventory dataset.
  - ii. If that previous structure request is deemed too old, order the same quadrangle again; although you might want to include a comment concerning the age of any updates, because the most recent imagery available may be the same 'old' data.
- e. Use the Select Features tool  to select the quadrangles that are located proximate to the FSPRO spread and are located in counties without cadastral data.
- f. Export these selected features (quadrangles) to create a new shapefile named: '<fire\_name>\_Quads' and compress (zip) to file of same name.
- g. When numerous quadrangles are selected, triage the most important/most likely to become impacted by the fire to allow the USGS folks to return the structure request incrementally (for a reasonable response time, expect each quadrangle to take about an hour of process time, longer if many structures are expected). Use as many levels of triage as deemed appropriate; in the past, we have, dependent on the severity of the fire and the number of quads requested, indicated up to five levels of importance (i.e. perform search on these few quads first, send results; then process these other quads, send results; followed by these quads, etc.; we have requested over 30 quads for one incident – i.e. La Brea Fire, CA). Request all necessary quads, however remember this is a special service provided by the USGS outside of their normal duties and work schedule, they have been willing to answer structure requests regardless of the timing – in other words they have suspended their normal routine to perform these emergency structure requests and have also come into work on what is typically a day-off for them, don't abuse their willingness to help out with fire management).
- h. Send the selected quadrangles to the USGS via email with other relevant information included: fire name, county, state, current time, current date, requested delivery time (be clear and fair; i.e. this afternoon, 12, 24, or 36 hours,

etc.), name of requestor, and any comments. Subject line should be: RAVAR Structure Extraction Request.

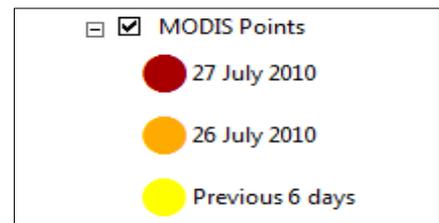
- i. Continue working on RAVAR map and report document in the meanwhile. You do not need to wait for the structure request to be returned to analyze the other datasets in the RAVAR template.

## 8. Reset MODIS Data and Legend

- a. Re-source to data previously downloaded:  
**Fires\_YYYY\your\_fire\_folder\Incident\_data\MODIS\**
- b. Edit legend and change the date from *XX Month YYYY* to the MODIS date stamp indicated on and previously recorded from the download page.
- c. Change Color of MODIS Symbology (From **RAVAR Palette**, choose **Fire: MODIS Points** – a circle with size 24):



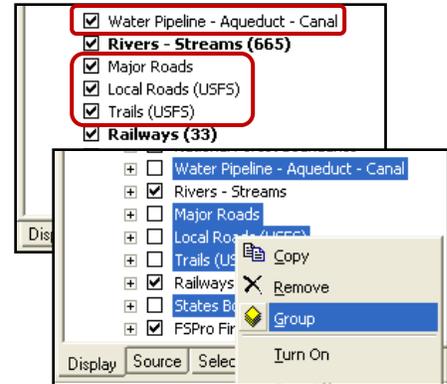
- i. To activate RAVAR Palette, ensure it is installed correctly [[Copy RAVAR Palette](#)]
- ii. To change the symbology, click on the symbol in the ArcMap Table of Contents (TOC) or from the Layer Properties-Symbology tab to open Symbol Selector box.
- iii. Choose 'RAVAR' in the drop-down Category box at top.
- iv. Each MODIS point uses the symbol for "Fire: MODIS Points"
- v. Today's MODIS points symbolized with the 5<sup>th</sup> Red down on the color palette (Tuscan Red). [Should be the default color]
- vi. Yesterday's MODIS points symbolized with the 3<sup>rd</sup> Orange down on the color palette (Electron Gold). [Change from default to this color]
- vii. Previous 6 days MODIS points symbolized with the 3<sup>rd</sup> Yellow down on the color palette (Solar Yellow). [Change from default to this color]



## 9. Remove Layers Beyond Extent of Map, so they do not appear in the legend

- a. Once the map extent is established, use the **Select Features on Screen** button  to select everything on screen. Hit the **Selection** tab on the bottom of the table of contents and write down the names of the layers not selected. ([How to add Select Features on Screen button to ArcMap interface](#))

- b. You will now group and move the data layers not within the mapped extent to the bottom of the ArcMap TOC (Not recommended that you 'remove' them from the TOC). Return to the display tab and select (**Ctrl-mouse click**) two of those layers not located within the mapped extent that are located within the same grouping (i.e. Critical Infrastructure – ArcMap does not permit the creation of a new group using data layers located in different groups). Right click on one of the highlighted layers and select the **Group** option. Name the grouped layer 'beyond extent at 1:50,000' (or whatever your scale is) and turn it off so the data is not visible. Now, individually, click and drag each of the remaining data layers beyond the mapped extent to the "beyond extent" grouping. Once all appropriate data layers have been placed into the "beyond extent" group, move the grouping to the bottom of the TOC to 'get it out of the way.'



**NOTE:** This grouping by scale permits handy recall of legend formatted data if RAVAR is repeated using an FSPro at broader extent that intersects previously unused layers.

(SAVE PROGRESS)

## 10. Modify Jurisdiction Legend

- All Features on Screen should still be selected
- Open Jurisdiction layer attribute table; Show "Selected" features; sort "STATUS" attribute ascending; scroll down the column and write down all selected "STATUS" values – these are the names of the primary management authority, federal agencies, State, County, and Private
- Edit Jurisdiction symbology to remove any agencies not displayed on the map (Right-Click Jurisdiction → Properties → Symbology...)

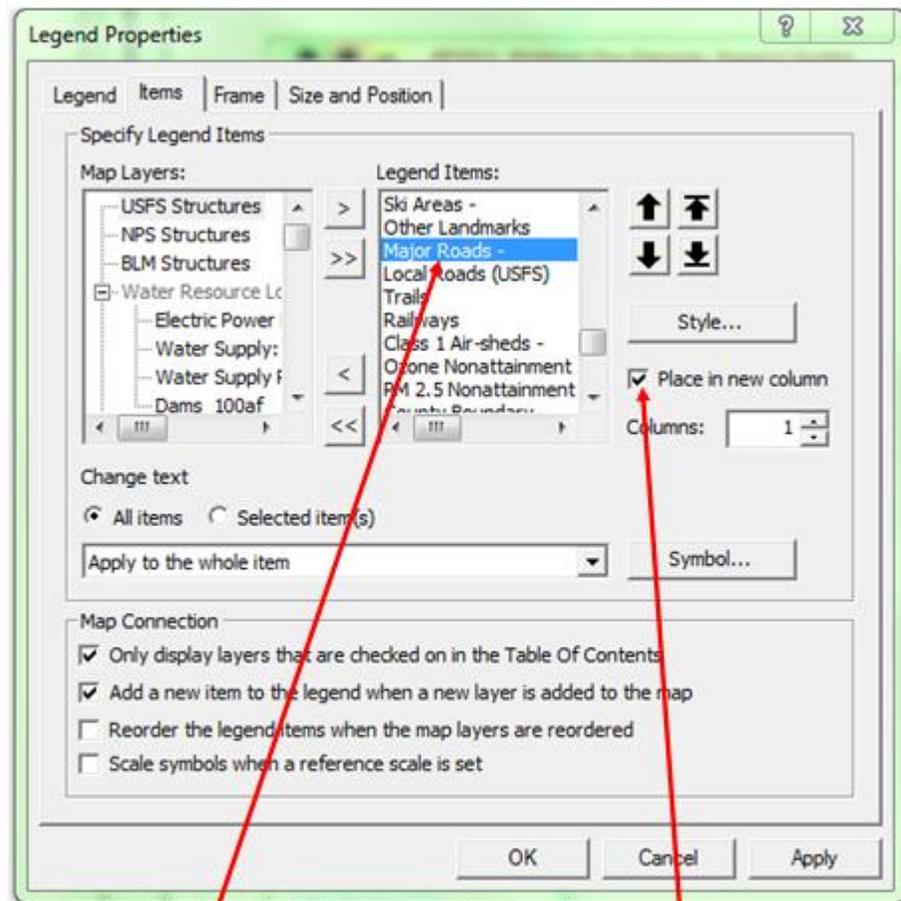
Selected Attributes of Jurisdiction						
FID	Shape	AREA	STATUS	RNA	WILD_IRA	
7142	Polygon	1097894262.1	USFS		IRA	
77809	Polygon	135560866.654	USFS		IRA	
79223	Polygon	834401.701725	USFS	ERNA	IRA	
79712	Polygon	26817091.7944	USFS		IRA	
79776	Polygon	140648658.772	USFS		IRA	
80450	Polygon	508255263.182	USFS		IRA	

Record: 1 Show: All Selected

## 11. If the legend is too long, split it:

- There are (at least) two ways, simple and slightly more complex, to create multiple columns in the legend.
  - You can modify the number of columns in the legend properties box, but I have found it to be unpredictable, and I like to have control over the

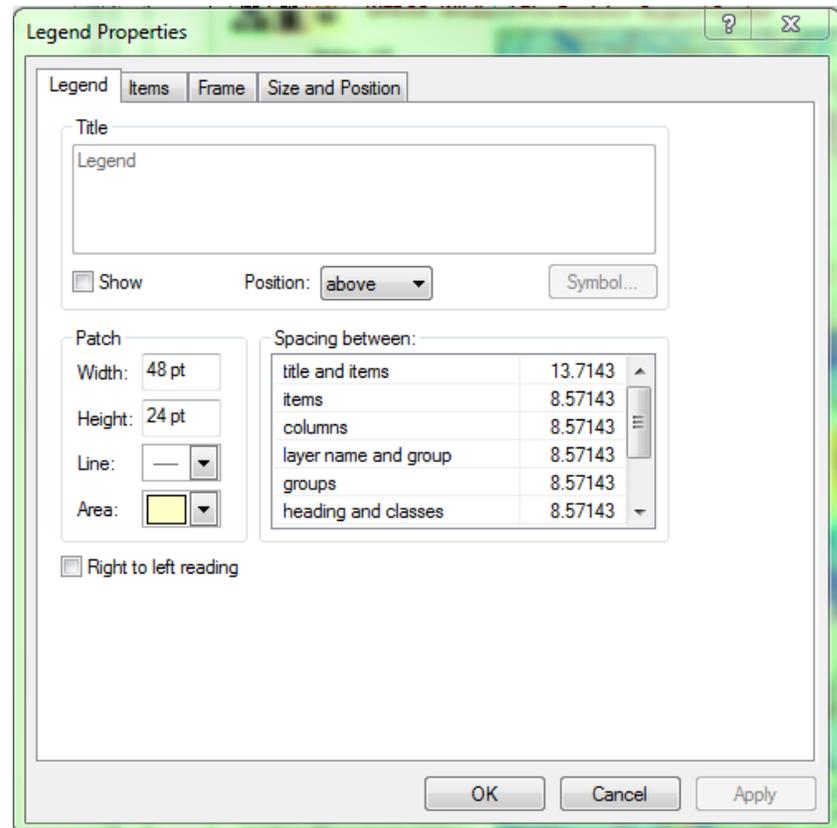
final appearance, so the easy way to control the columns is to double-click on the legend to open the Legend Properties box:



Choose the data layer with which  
you want to start the new column

Click box for "Place in new column"

- ii. The more complex method involves creating an additional legend: one legend will contain the incident specific data (the data layers you must download for each RAVAR plus structures) and the other will include the remaining values (the data layers that could appear in all RAVARs, not downloaded for the specific fire)
  1. From ArcMap main menu: choose Insert → Legend
  2. Choose layers that appear on [first page of full legend](#)
  3. Erase the chosen data layers from step 2 from original legend
  4. Place new legend above the old legend (which can be split into two columns using the previously described method) as displayed below (left) and [larger format in appendix](#)



- iii. When building a second legend (or even when editing one legend), the default settings may change. To change them back, open the Legend Properties box, navigate to the Legend tab and set as in the above image. Patch = 48pt; Height = 24pt; spacing between Title and items = 13.7143; and all other spacing between = 8.57143.

## 12. Modify Map Text (*ALL TEXT IN BLUE*) and Legend

Including title, sub-titles, legend, values at risk text, parcel/structure text, “prepared by” statement, and map distance scale

(NOTE: In map and document templates *BLUE* text indicates user modification is required – Either edit *BLUE* text to incident specific information or delete as necessary.)

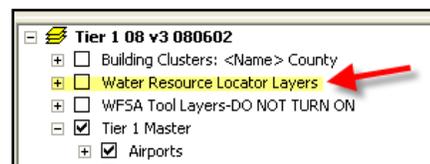
- a. Edit all title information as prompted on map template, e.g. fire name, FSPRO details, RAVAR code (format: CI = Critical Infrastructure, A = 1<sup>st</sup> run, date = yyyyymmdd, and authors initials: i.e. CI\_A\_20110701\_jk), etc.

- b. Edit and adjust legend (by changing names in TOC and ...right-click on legend → Properties...)
  - i. Assure that building clusters are listed directly under FSPRO output. If multiple counties are displayed, turn off all but one “**Building Clusters <county name>**” layer and rename the remaining layer to simply “**Building Clusters**”
  - ii. FSPRO Barrier layer goes beneath the perimeter data in the legend.
  - iii. Rename FSPRO Barrier: XX Month YYYY to reflect the FSPRO “Analysis Start” date.
- c. The bottom-left corner of the map includes all the caveats/disclaimers that typically might appear on a RAVAR report. Delete the caveats that do not apply (if you did not need to call the USGS for structure identification, you do not need the structure points disclaimer). Ensure structure, mines, and recreational structure statements are accurate and/or necessary, modify or delete statements based on your specific Incident. Convert remaining caveats to black text.
- d. Change authorship at very bottom of page (you may want to perform this step on the blank template and save it out as your new blank template so you do not have to modify the authorship line each time you perform a RAVAR).
- e. Change data frame units to miles from meters if necessary to assure map scales displays in conventional US units
- f. Select layout, disclaimers, and title and center and distribute evenly by using the functions on your right mouse button
- g. Modify the scale bar to represent at least 10 map-miles.

(SAVE PROGRESS)

### 13. Identify Water Resources Downstream from Potential Fire Area.

- a. Zoom out to approximately 2x current scale
- b. Turn on the Water Resources Locator Group.
- c. Look for potential issues downstream of fire and note them in your word document/notebook.
- d. Turn off this group when finished and return scale back to previous analysis extent.

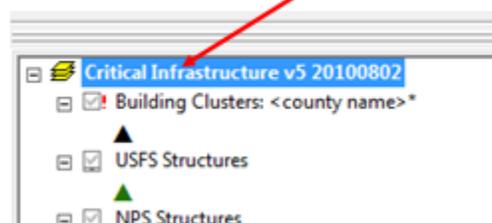


**An example of reporting water resources at risk downstream:** “Dillon Creek is within/near the mapped perimeter and flows in the Klamath River Basin. Water supply infrastructure downstream of fire area includes a water treatment plant and water supply intake on the Klamath River, located in the community of Happy Camp, NE of the mapped perimeter. Dillon Creek and other potential source streams to the Klamath River are located within the mapped perimeter and post-fire erosion may affect water quality downstream.”

#### 14. (OPTIONAL) Re-project Map to Align to N-S Axis

- a. The mxd RAVAR Template opens in an Albers Equal Area projection, which matches the projection of all RAVAR data. This projection is necessary to preserve accurate measurements when running the RAVAR Tool. Expect N-S axis to be tilted
- b. To align the N-S axis to vertical, re-project the map to the local UTM system. This will not affect the data or the use of the RAVAR Tool. To determine which UTM zone the fire is located within, refer to the map provided in C:\RAVAR\_YYYY\Reference\UTM\_Zones\_USA48.pdf
- c. To re-project the map:
  - i. Open the Data Frame Properties box:

Right-click the Data Frame and choose Properties

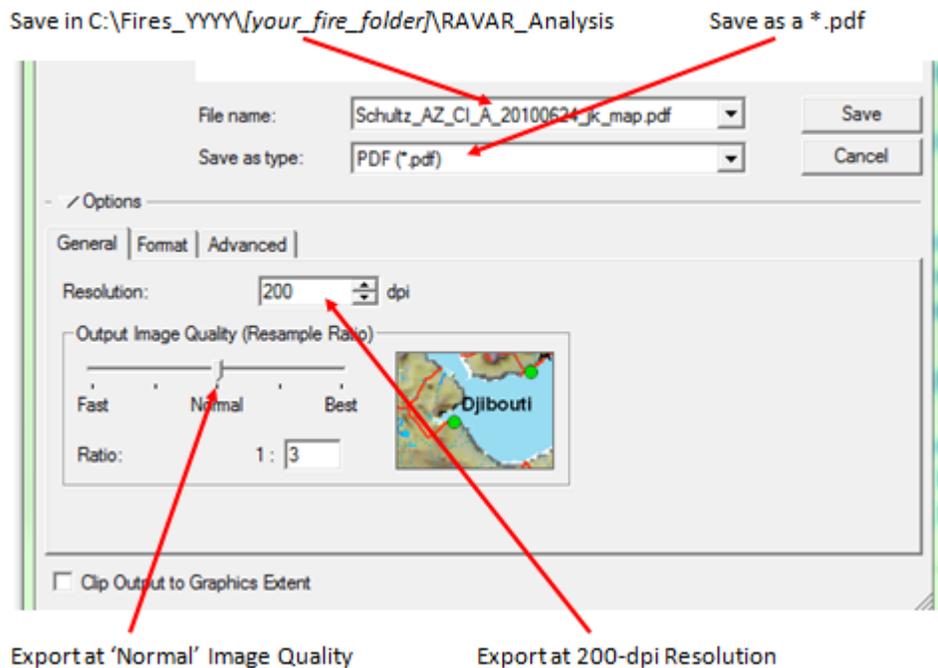


- ii. Choose the ‘Coordinate System’ tab
- iii. The UTM projections are located under: Predefined → Projected Coordinate Systems → UTM → NAD 1983 → choose correct zone.

## 15. Export Draft Map

Export to \*.pdf at 200 dpi at normal image quality (allows for a detailed map image with a relatively small file size and a relatively shorter export time) to the RAVAR\_Analysis folder: C:\Fires\_YYYY\[your\_fire\_folder]\RAVAR\_Analysis\

(NOTE: We recommend this first export map be printed at 11x17, if possible, to facilitate review. You should expect to make edits to this map and re-export following review and finalization.)



**DON'T FORGET TO SAVE YOUR MAP AND REPORT AS YOU WORK!**

## CONDUCT VISUAL ASSESSMENT OF RAVAR MAP: WHAT IS SIGNIFICANT?

Transition now from GIS Technician to Geographic Analyst. With notebook before you and pen in hand study the map closely.

- Where are the geographic features (towns, landmarks, roads, etc.) and valued resources relative to predicted fire spread?
- Which features are most significant? Most abundant? Most unique? Most threatened?
- If a feature is especially unique, explain why in a few words
- How far are they from the mapped perimeter? (Use distance tool)
- In which direction?
- In which FSPro zone or zones?
- How are features distributed? Are they grouped or scattered? In what patterns?
- What are the approximate counts of point features? The length and orientation of line features?

Take your time with visual assessment. You are gathering the information to feed into the RAVAR Report. Be focused, clear, and accurate.

Report direction using cardinal points and subdivisions; e.g. **N**, **ENE**, **SW**, even **NWNW**, if the direction is that clear. Avoid reporting in degrees. Cardinal points can be conceptualized more rapidly by the reader.

Report distances in whole numbers. These are easier to read and the composite GIS uncertainties make use of tenth of miles specious. Avoid adding verbiage such as “approximately” as such qualifiers are reasonably assumed and merely add unnecessary length to the report.

The goal is accuracy, parsimony, and clear language. Assume your reader has precious little time to understand the map and report. Your summary focuses their thinking, guiding them to the key information on the map in the context of potential fire spread.

## Run RAVAR Tool: Conditions and Warnings

- a. ESRI has certain restrictions on file and folder naming, which are different for all input data types (Shapefiles, rasters, feature class, etc.). The highest restrictions are listed below; however they do not necessarily pertain to all data types. It is recommended to follow these conventions for all data types if you do not know which data types support which restrictions.
  - i. Workspace directory paths cannot contain spaces or special characters
  - ii. Input & output data file names
    - 1. Cannot have spaces or special characters(#, @, % etc)
    - 2. Cannot be longer than 13 characters
  - iii. At ArcGIS 9.2 and earlier versions, folder names in the path to input or output cannot be over 8 characters. At version 9.3, this restriction is removed, so folder names can be over 8 characters long. This rule does not appear to affect shapefile and feature layer outputs, however it may be useful to know this restriction
- b. The RAVAR Tool only works on Shapefiles and Feature Layers, it will not analyze rasters or coverages.
  - i. When running an analysis from ArcMap using the RAVAR Tool, any shapefile that is added to the map is treated as a feature layer by ArcGIS. Therefore, if these layers are chosen using the dropdown list in the tool, the special naming conventions outlined above must be used
  - ii. You can choose to navigate to a shapefile not in your table of contents for analysis as well; naming conventions still apply
  - iii. You will notice in the following step, that the FSPRO Run, does not have to follow all these naming conversions. This layer is considered the Clip Features layers, and not the Input features layer (analysis layer). ESRI does not impose the restrictions on naming of layers that are not the actual Input or Output layers, even though they may be used in the geoprocessing. As a general rule of thumb, it is best to always follow these conventions unless you know specifically that they don't apply to your situation.
- c. All output geometries are in the same units as the input analysis layer
  - i. These values are used in calculating ACRES & MILES for polygon and line features, respectively. The assumed input units are meters, as all layers for RAVAR analysis are required to be in the following projection: USA\_Contiguous\_Albers\_Equal\_Area\_Conic\_USGS\_version

- d. An equal area projection is necessary to preserve shape for accurate area calculations.
- e. Any layers not in this projection are subject to errors due to misrepresentation of areas created by some projections, in particular geographic coordinate projections.
- f. Your FSPro input doesn't have to be in the same projection, the tool will check its projection and re-project accordingly

### Run RAVAR Tool: Analysis Procedure

The RAVAR Tool is simply a utility that saves time by partially automating the process of summarizing assets (polygons, lines, and points) by FSPro zones (polygons). The tool calls an Excel file with macros which import the summarized data and help prepare it to copy into the RAVAR report document. The RAVAR tool will output an \*.xls file with the summary data by FSPro probability class. This file will be imported into Excel to create the RAVAR report tables.

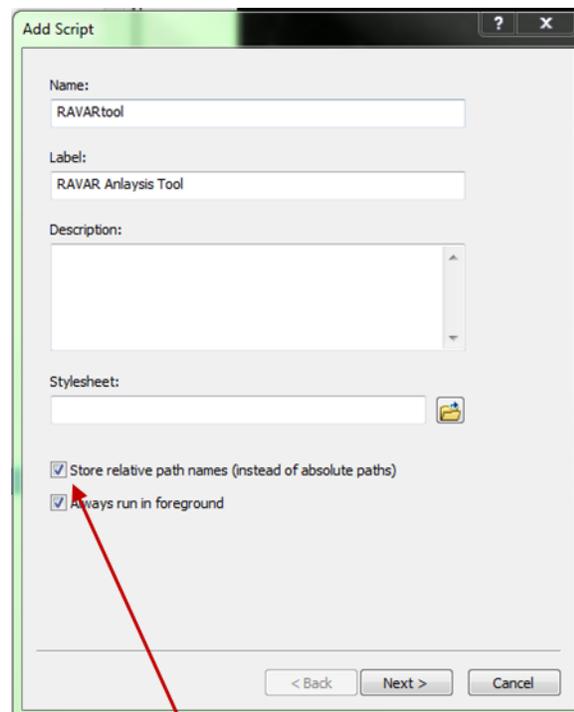
**Attention:** Are your computer and ArcGIS configured properly to use the RAVAR Tool? See Computer Setup Section for instructions on RAVAR Tool Set-up...

#### 1. Confirm RAVAR Tool is Loaded in ArcGIS

Open Arc Toolbox and confirm that the RAVAR Tool is available. If not, check [Set-up procedures](#) to add the tool.

#### 2. Due to issues between arc9.x and arc10.x, the RAVAR tool will sometimes not load as expected.

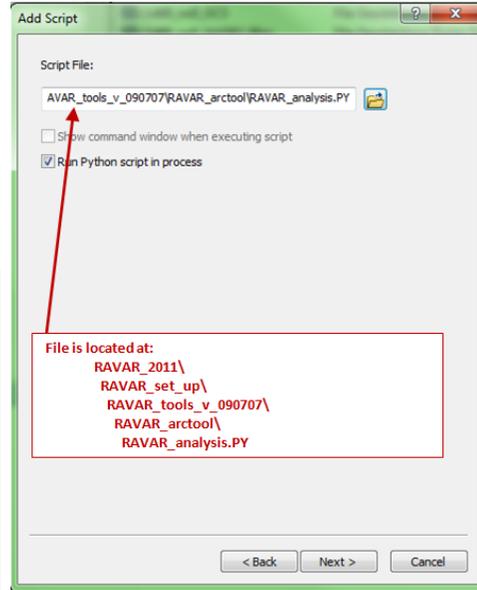
- a. If this occurs, one can manually add the script to their toolbox. Open ArcToolbox and right-click on one of the toolboxes , choose 'Add' then 'Script...'. An 'Add Script' pop-up box should appear. Choose a name and label (the label appears as the name in the ArcToolbox) and ensure to check box to enable storing relative path names. Click Next.



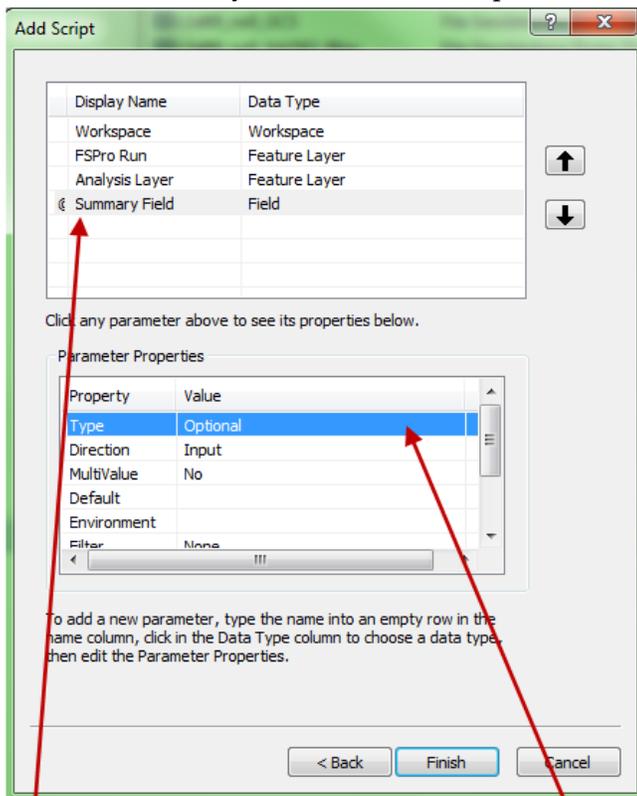
Ensure to Check box to enable storing relative path names

- b. Click on the folder button to navigate to the script which should be located at:  
 \RAVAR\_YYYY\RAVAR\_set\_up  
 \RAVAR\_tools\_v\_090707\RAVAR\_arctool  
 \RAVAR\_analysis.PY. *Click Next.*
- c. Manually enter the four variables coded into the script within the third 'Add Script' box.

Display Name	Data Type
Workspace	Workspace
FSPRO Run	Feature Layer
Analysis Layer	Feature Layer
Summary Field	Field

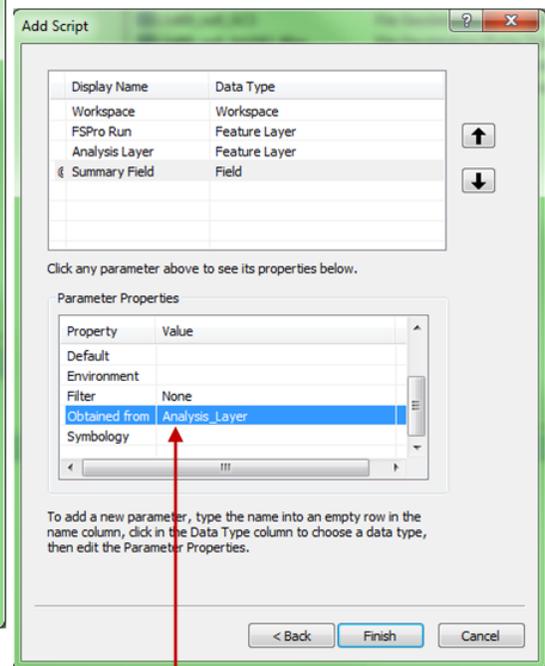


- d. Select the Summary Field row in the top box and in the lower box, change the 'Type' from 'Required' to 'Optional' and change the 'Obtained from' to 'Analysis\_Layer' with the drop-down boxes. *Click Finish.*



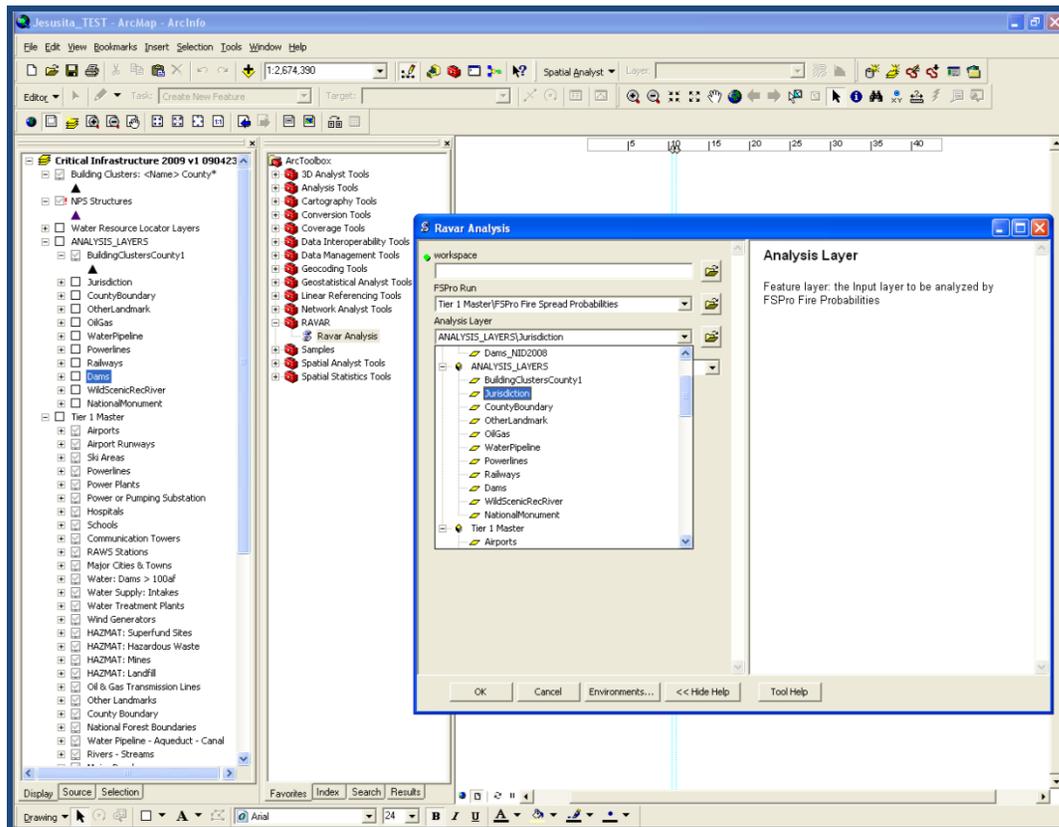
Enter the Display Names and locate correct Data Type via the drop-down menu.  
 Highlight/Select the 'Summary Field' row in top table

With the 'Summary Field' selected, in the top table, change 'Type' to 'Optional' in the lower table



With the 'Summary Field' selected, in the top table, change 'Obtained from' to 'Analysis\_Layer' in the lower table

### 3. To run a single analysis double click the RAVAR Analysis tool



(Note: Single layer analysis is rarely used in normal RAVAR operations. It is recommended for training purposes only to familiarize the user with Tool use.)

- a. Chose your workspace: Fires\_YYYY\[your\_fire\_folder]\RAVAR\_Analysis\Workspace
- b. Select your FSPro Fire Spread Probabilities Layer as the FSPro run (sourced to the FSPro output shapefile from WFDSS)
- c. Select your analysis Layer from the ANALYSIS\_LAYERS\*\*\* dropdown list The Summary Field is the field from the Analysis layer you want to summarize by (can be left blank)

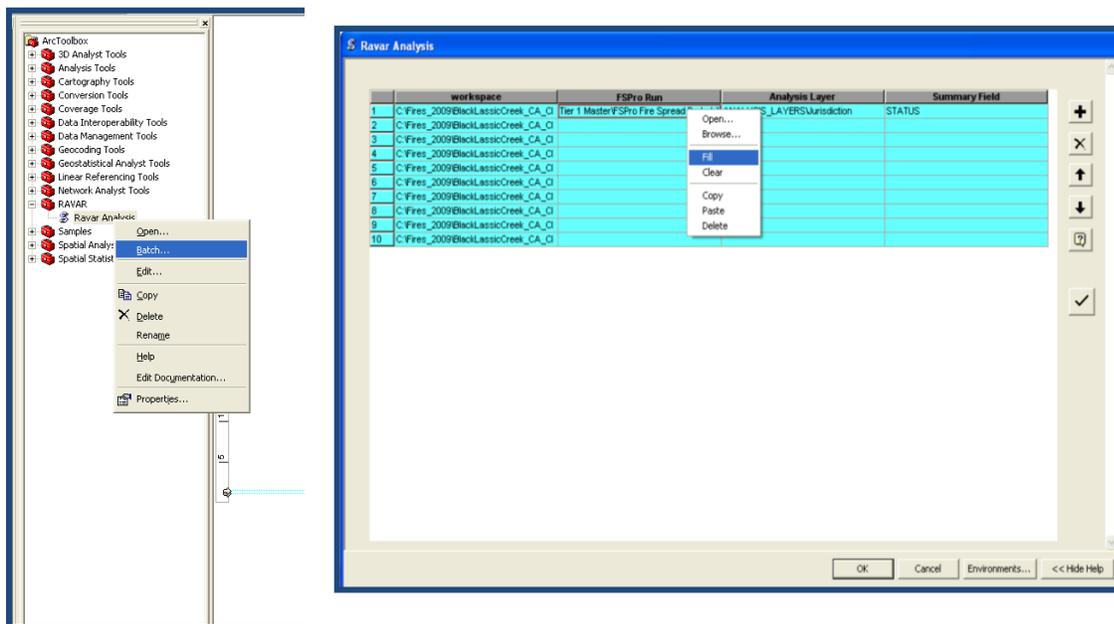
**\*\*\*NOTE:** The layers in the ANALYSIS\_LAYERS group are the same as those found elsewhere in the table of contents, they have just been renamed to work with ESRI geoprocessing tools (see **Warnings & Conditions**)

If you need to analyze a layer that is not in this list, make sure the name (including the group name in the Table of Contents) does not contain spaces or special characters (;, -, @, #, &, etc.) A convenient way to do this is to copy the layer from the Critical Infrastructure Group, into the ANALYSIS\_LAYERS group, and rename it following the rules outlined in the **Warning & Conditions** section

#### 4. Use Batch tool in order to analyze multiple features at once.

- a. Right click the tool and select *Batch...*
- b. Fill in cells as normal
- c. Click the  sign to add a new analysis layer
- d. The *workspace* and *FSPro Run* cells should be the same for all layers
- e. Right click the cell & select *fill* to populate selected rows
- f. The **workspace** and **FSPro Run** cells should be the same for all layers
- g. Refer to the reference table below “Standard ANALYSIS LAYERS & SUMMARY FIELDS” for

**Note:** The Green cells are required, white is optional, red indicates an error



NOTE: If the tool doesn't work, remember to check the [naming conventions](#)

NOTE: Do not leave any rows blank or incomplete within the batch set-up; they cause the batch to crash (although 'Summary Field' can be blank because it is an optional field).

NOTE: Also, if tool is not working, check to ensure you have correctly [set-up your computer](#)

NOTE: When creating a blank table (a table with no values within it), the Tool progress screen will have a message in red, which usually indicates an error within ArcMap, but this is normal; it has not erred out. In addition, we have found that it may report an error that did not actually occur. Check your data tables to ensure they were completed.

**TABLE: Standard ANALYSIS LAYERS & SUMMARY FIELDS\*\*\* for summarizing selected Critical Infrastructure (CI) layers using the RAVAR Tool.**

Analysis Layer	Summary Field
CountyName	(blank)
FS_Structures	(blank)
NPS_Structures	(blank)
BLM_Structures	(blank)
FS_IRA	(blank)
FS_RNA	(blank)
Wilderness	(blank)
BLM_WSA	(blank)
Jurisdiction	STATUS
CountyBoundary	NAME
OtherLandmark	NAME
OilGasLines	OPERNAME
WaterPipeline	NAME
ElecTransLines	BUS_NAME
OilGasWells	CLASSIFIED
Railways	ROWN1_NAME
Dams	DAM_NAME
WildScenicRecRiver	LU_NAME

**\*\*\*NOTE:** These analysis layers and their corresponding Summary Fields are hard coded to fill in tables for the report, using the RAVAR Summary Excel worksheet

## Import Summary Tables to Excel Worksheet to Format Tables before placing within Report Document

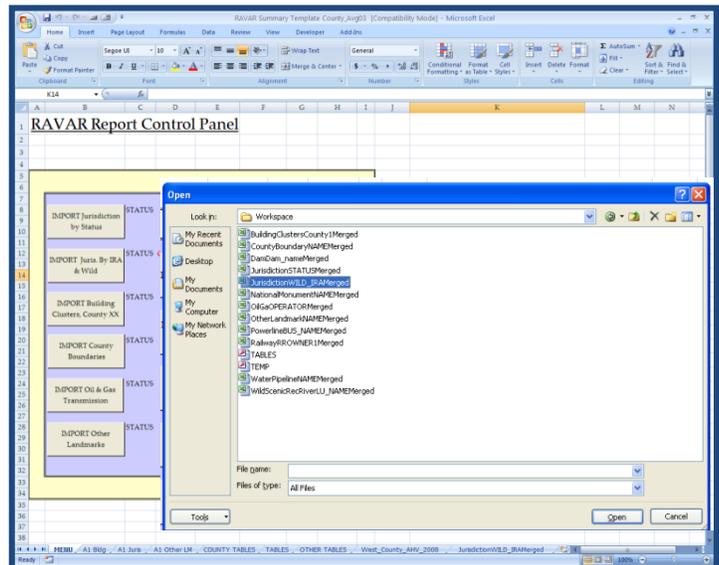
1. Open up RAVAR Summary Template County\_Avg.xls Excel Worksheet located at \Fires\_YYYY\[your\_fire\_folder]\RAVAR\_Analysis\Workspace\ folder
2. Enable MACROS (see EXCEL help for additional details)



- a. Excel 2007, windows icon → excel options → Show Developer tab in the Ribbon
  - i. From the Developer tab → Macro Security → Enable all macros
- b. EXCEL 2003 or older:
  - i. TOOLS → MACROS → SECURITY → Medium
- c. Close Excel and reopen for settings to take place

### 3. Click on the MENU worksheet

- a. Click on the corresponding IMPORT buttons for the files you analyzed from ArcGIS
- b. Navigate to your worksheet
  - i. Name of file to import will match name given in ANALYSIS\_LAYERS followed by the Summary Field (if any):  
i.e. JurisdictionSTATUS, FS\_RNA, and/or CountyBoundaryNAME

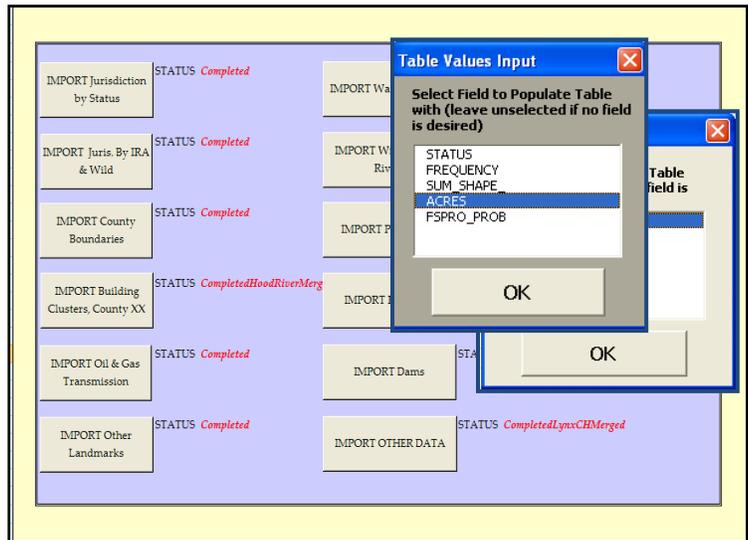


- c. *Completed* will show up next to status
- d. IMPORT Building Clusters, CountyXX Button
  - i. Imports building clusters for each county, one at a time
  - ii. There may be only one county to import

e. IMPORT OTHER DATA

- i. Imports any excel worksheet output from the ArcGIS RAVAR tool & prompts user for inputs into a pivot table, by FSPRO Zone
- ii. Use to Import data you may have added to the RAVAR Analysis

1. 1<sup>st</sup> prompt is for the columns data
- 2<sup>nd</sup> prompt: values data



(SAVE PROGRESS)

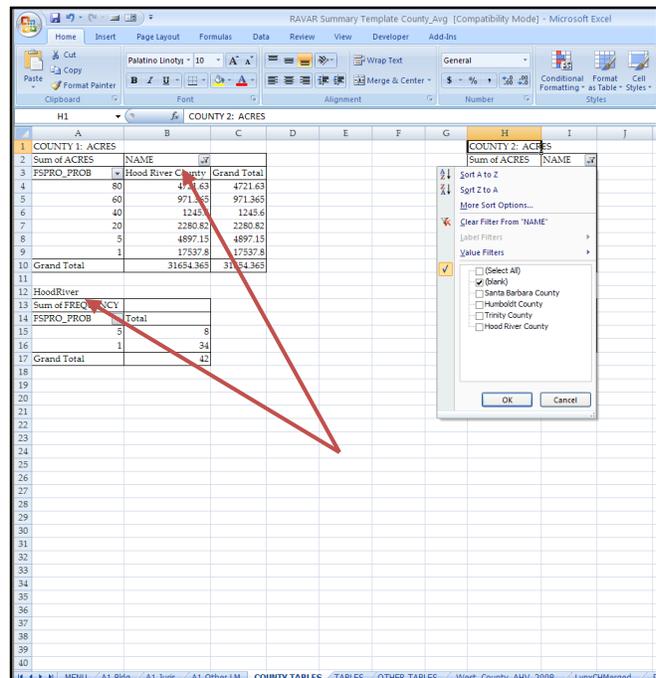
*Note: The 1<sup>st</sup> prompt that appears after the IMPORT OTHER DATA is clicked is typically the summary field from the ArcGIS RAVAR tool analysis. The 2<sup>nd</sup> prompt is will usually be the values that were calculated using the ArcGIS RAVAR tool. These are ACRES (for polygons), MILES (for lines) or FREQUENCY (for points)*

4. **NOTE: If values failed to fill-in, save excel worksheet.** We don't know why the tables do not automatically fill in sometimes, but have discovered that saving the document seems to update the tables. The "Refresh All" button under the 'Data' tab in Excel, does not seem to fill-in those values as consistently as the "Save" button does. I know it seems counter-intuitive to save a form that doesn't seem to be working, but that is the only work-around we have found that seems to work every time. Remember, if you do make a critical mistake; you can start over with a blank Excel worksheet found in C:\Fires\_YYYY\\_Firename\_ST\_CI\_Template\RAVAR\_Analysis\Workspace and an additional backup in the same relative location within the RAVAR\_YYYY folder. Remember to copy and paste it into your working fire folder before using it...

5. **Completing the A1 Bldg Tables**

- a. All data in these formatted tables refers to data in the COUNTY\_TABLES tab and the West\_County\_AHV\_2008 tab
- b. Click on the COUNTY\_TABLES tab

- c. Make sure your COUNTY XX:ACRES table corresponds to the same county in the building clusters table beneath it
  - i. The information in the COUNTY\_TABLES tab rows 1-10 has a different data source than the information displayed in rows 12-19; therefore each table must be adjusted separately.
  - ii. The information presented in rows 12-19 derive from the building clusters data (MENU tab: "IMPORT Building Clusters, County XX" which creates tabs for each county; i.e. SantaBarbara and SanLuisObispo). When a county is imported into Excel, line 12 in the COUNTY\_TABLES tab should fill-in with the County Name and beneath it is its corresponding count of building clusters.
  - iii. The information presented in rows 1-10 derive from county data (MENU tab: "IMPORT County Boundaries" that creates the CountyBoundaryNAME tab). The selection icon in cell B2 should be clicked to display only the county listed in cell A12. The selection icon in cell I2 should be clicked to display only the county listed in cell H12. The selection icon in cell P2 should be clicked to display only the county listed in cell O12. The selection icon in cell W2 should be clicked to display only the county listed in cell V12.
  - iv. If any of the above row-12 cells (A12, H12, O12, V12) is blank, ensure its corresponding row-2 drop-down menu filter is set to "(blank)" so that no county is listed in its corresponding row-3 cell (B3, I3, P3, W3)
- d. Click on A1 Bldg Worksheet
  - i. Input STATE INITIALS
    - 1. Notice if the State Initials is left as is (STATE INITIALS), the County Average will be a red zero, once the correct initials are entered, the average should be populated



County #1 Summary Calcs w/ County Median						
Hood River County			STATE INITIALS			
Fire Spread Probability	Acres Threatened		Hood River County		Value by Zone	Cumulative Value
	Acres by Zone	Cumulative Acres	Count by Zone	Cumulative Count		
> 80%	4,722	4,722	0	0		
60 - 80%	971	5,693	0	0		
40 - 60%	1,246	6,939	0	0		
20 - 40%	2,281	9,219	0	0		
5 - 20%	4,897	14,117	8	8		
1 - 5%	17,538	31,654	34	42		

CountyAverage: 0  
Hood River  
"Use file "WEST\_County\_AHV\_2008.xls" to find appropriate value"  
Copy and paste ONLY the WHITE portion of any data table used

County #1 Summary Calcs w/ County Median						
Hood River County			OR			
Fire Spread Probability	Acres Threatened		Hood River County		Value by Zone	Cumulative Value
	Acres by Zone	Cumulative Acres	Count by Zone	Cumulative Count		
> 80%	4,722	4,722	0	0	\$0	\$0
60 - 80%	971	5,693	0	0	\$0	\$0
40 - 60%	1,246	6,939	0	0	\$0	\$0
20 - 40%	2,281	9,219	0	0	\$0	\$0
5 - 20%	4,897	14,117	8	8	\$1,637,872	\$1,637,872
1 - 5%	17,538	31,654	34	42	\$6,960,956	\$8,598,828

CountyAverage: 204,734  
Hood River  
"Use file "WEST\_County\_AHV\_2008.xls" to find appropriate value"  
Copy and paste ONLY the WHITE portion of any data table used

ii. Make sure county names are correct & not duplicated in any table (highlighted in yellow)

County #1 Summary Calcs w/ County Median						
Hood River County			STATE INITIALS			
Fire Spread Probability	Acres Threatened		Hood River County		Value by Zone	Cumulative Value
	Acres by Zone	Cumulative Acres	Count by Zone	Cumulative Count		
> 80%	4,722	4,722	0	0		
60 - 80%	971	5,693	0	0		
40 - 60%	1,246	6,939	0	0		
20 - 40%	2,281	9,219	0	0		
5 - 20%	4,897	14,117	8	8		
1 - 5%	17,538	31,654	34	42		

CountyAverage: 0  
Hood River  
"Use file "WEST\_County\_AHV\_2008.xls" to find appropriate value"  
Copy and paste ONLY the WHITE portion of any data table used

# 4 Summary Calcs w/ County Median						
Grand Total			STATE INITIALS			
Fire Spread Probability	Acres Threatened		Grand Total		Value by Zone	Cumulative Value
	Acres by Zone	Cumulative Acres	Count by Zone	Cumulative Count		
> 80%	0	0	0	0	\$0	\$0
60 - 80%	0	0	0	0	\$0	\$0
40 - 60%	0	0	0	0	\$0	\$0
20 - 40%	0	0	0	0	\$0	\$0
5 - 20%	0	0	0	0	\$0	\$0
1 - 5%	0	0	0	0	\$0	\$0

CountyAverage: 0  
Grand  
"Use file "WEST\_County\_AHV\_2008.xls" to find appropriate value"  
Copy and paste ONLY the WHITE portion of any data table used

iii. If there is no county for the table, make sure it reads Grand Total & all values are zero

1. If this is not the case, revisit the steps in the section 4.c.iii above

iv. Check any red zeros to ensure that they are true zeros and not reference errors

(SAVE PROGRESS)

## 6. Completing the A1 Juris Tables

- Click on A1 Juris tab worksheet
- worksheet should be populated automatically when the TABLES are updated (imported from MENU screen)

- c. Double check red zeros to ensure they should be zeros

## 7. Completing the OTHER LM Table

- a. A1 Other LM needs to be populated manually
- b. From the TABLES tab, scroll to the OTHER LANDMARKS table (row 100)
- c. Right click on any FSPro Zone cell and sort descending, if not done already
- d. Select all records in this table and copy and paste into A1 Other LM worksheet
  - i. Make sure you insert the *<none identified per available data>* for those zones with no landmarks in them
- e. Format table according to example in electronic Excel worksheet (on right of A1 Other LM tab) & underline the cells between each FSPro Zone Value
  - i. 80 = >80, 60 = 60-80%, 40 = 40-60% etc.

(SAVE PROGRESS)

## 8. Dealing with OTHER TABLES

- a. Pivot table is generated in OTHER TABLES worksheet & can be manipulated to display the data as desired from IMPORT OTHER DATA button
  - i. click on the PivotTable Tools Options Tab
  - ii. Make sure you have one cell selected inside table
- b. You can drag and drop items into rows, columns and values, depending on how you want to summarize
  - i. Make sure FSPRO\_PROB is in Row labels and Sum of ACRES is in Values area
  - ii. Copy these values into the blank tables at the bottom of the A1 Juris worksheet. These tables are formatted like all the others for the report

FSPRO_PROB	Total
80	3962.66
60	495.093
40	525.07
20	835.793
5	1373.43
1	4338.91
<b>Grand Total</b>	<b>11530.956</b>

**PivotTable Field List**

Choose fields to add to report:

- FREQUENCY
- SUM\_SHAPE\_
- ACRES
- FSPRO\_PROB
- ACRES2

Drag fields between areas below:

Report Filter: [Empty]

Column Labels: [Empty]

Row Labels: FSPRO\_PROB

Values: Sum of ACRES

Defer Layout Update Update

- 9. All the tables in the A1 Bldg, A1 Juris and A1 Other LM are now ready for inclusion in the report

(SAVE PROGRESS)

# COMPLETE RAVAR REPORT DOCUMENT

Rename and open the “RAVAR Critical Infrastructure Template final.docx” with the name of: firename\_state\_level(CI/NCR)\_RunLetter\_Date(YYYYMMDD)\_analystInitials\_doc.docx

## 1. Header Information

Fill in Incident Name, State, Report Date, RAVAR Analyst, RAVAR Code, FSPro Analysis Name, FSPro Projected From, RAVAR Requested, FSPRO Analyst Name, and ICS\_209 Incident Number (if available)

## 2. FSPro Basis for Analysis

Mention caveats of FSPro Analysis from FSPro Analyst and if needed, any truncation of the FSPro Output and the direction in which that occurs.

*An Example:*

- *FSPro analyst states the analysis includes a modeled burnout operation along the SE flank along Highway 89*
- *Straight line truncations of the FSPro area to the W reflects geographic limit of data used for the analysis*

## 3. General Report Formatting Items

- a. Insert “Report continues to next page” onto each page after final edit.
- b. Measure fire’s distance from barrier file and major populated areas.
- c. Bold distances and directions in the report.
- d. Look at Random McNally Maps to see if there is Wilderness near the fire. State this in the summary.
- e. Use phrases like fire spread projection indicates N and S with pronounced potential to..., very few structures are threatened... Numerous structures are threatened... Water quality and how it may affect a community’s infrastructure.
- f. Use information from 209 and make sure that you cite your source as the 209.
- g. Change footer to match document name

## 4. General Assessment

- a. State the location of the current fire perimeter. Use known landmarks as the anchor points of describing the fire location.
- b. Assuming no further suppression: Describe the projected spread if no further suppression would occur on the incident.

- c. Communities threatened: Name the communities in the spread probabilities zone that are threatened.
- d. Major Infrastructure: Describe the roads, Oil and Gas Pipelines, Communication Towers, Railroads, etc. that are threatened. Describe which spread probability zones each of these assets are located.
- e. Water Resources: Describe water structures such as dams.
- f. Other resources threatened: Many of these items might come from the 209 if NCR data is not available.

**(SAVE PROGRESS)**

## **5. Tables – Values assessed in this Report**

### **a. Jurisdictions within FSPro Spread Zones Table**

Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Juris first table to this location. After the table has been copied, then you will need to right mouse click on the table tab and click cell alignment and then click the center, center box. Acres field should have commas.

### **b. Designated Roadless and Wilderness Areas Table**

Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Juris second table to this location. After the table has been copied, then you will need to right mouse click on the table tab and click cell alignment and then click the center, center box. Acres field should have commas.

### **c. Estimates of Structure Values at Risk Combined County Table**

Use appropriate header and footer text from the template verbiage to the structure tables. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Bldg worksheet summary (table starts at S75). After the table has been copied, then you will need to right mouse click on the table tab and click cell alignment and then click the center, center box. Check to make sure that acres and value fields have commas.

### **d. Estimates of Structure Values at Risk Individual County Tables**

1. Use appropriate header and footer text from the template verbiage to the structure tables.
2. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Bldg worksheet (first county table starts at cell B4).
  - a. Right mouse click on the table tab → cell alignment → center
3. Check to make sure that acres and value fields have commas.

### **e. Other Tables**

1. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Juris tables not previously copied
2. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Bldg worksheet (first county table starts at cell B4).

- a. Right mouse click on the table tab → cell alignment → center
    3. Check to make sure that acres and value fields have commas.
  - f. Other Landmarks Table
    1. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1 Other LM worksheet.
    2. Copy and paste the RAVAR Summary Template County\_Avg.xls, A1\_Bldg worksheet (first county table starts at cell B4).
      - a. Right mouse click on the table tab → cell alignment → center
    3. Check to make sure that acres and value fields have commas.
6. Choose “Save As” pdf.
7. Print Report and Map for Review.

## POST RAVAR RESULTS

1. Once the map and report document have been reviewed, corrected, and approved: email a statement indicating the RAVAR report and map have been completed and uploaded to the WFDSS website to the RAVAR Regional Coordinator, FSPro Analyst, RAVAR Requestor, RAVAR Group, and any other interested parties (you may attach report and map to email, but be conscience of email file size limitations).
2. Login to WFDSS production site at [https://wfdss.usgs.gov/wfdss\\_proto/faces/jsp/login/WFDSSLogin.jsp](https://wfdss.usgs.gov/wfdss_proto/faces/jsp/login/WFDSSLogin.jsp)
3. Click the 'Analyses' tab → locate the radio button associated with the RAVAR request (ensure 'Type'=RAVAR) → click 'View Results'.
4. Confirm RAVAR Analysis name is listed in first box
5. Locate the FSPro Analysis used in report from drop-down menu
6. Click the 'Upload' button
7. Navigate to the RAVAR report
  - a. Should be located at Fires\_YYYY\*incidentName*\_ST\_ai\RAVAR\_Analysis\
8. Click the 'Upload button again
9. Navigate to the RAVAR map
  - a. Should be located at Fires\_YYYY\*incidentName*\_ST\_ai\RAVAR\_Analysis\
10. Check the 'Completed' box and click 'Save' (repeating this process will un-complete the RAVAR; ensure it is completed in the list of analyses under the 'Analyses' tab).
11. Backup project directory (we use a networked hard drive to record all RAVARs in one common location)

## RAVAR DEVELOPMENT CONTACTS

### Point/Person of Contact

Laurie Kurth (406) 329-4947 [lkurth@fs.fed.us](mailto:lkurth@fs.fed.us)

### WFDSS Data Lead

Ben Butler (208) 387-5222 [ben\\_butler@nps.gov](mailto:ben_butler@nps.gov)

### Project Lead

Dave Calkin (406) 329-3424 [decalkin@fs.fed.us](mailto:decalkin@fs.fed.us)

### RAVAR Technical Lead

Kevin Hyde (406) 329-3318 [kdhyde@fs.fed.us](mailto:kdhyde@fs.fed.us)

### Data and IT Manager

Amy Steinke (406) 329-3384 [asteinke@fs.fed.us](mailto:asteinke@fs.fed.us)

### RAVAR Analysts

Jeff Kaiden<sup>1,4</sup> (406) 329-3387 [jkaiden@fs.fed.us](mailto:jkaiden@fs.fed.us)

Jon Rieck<sup>3</sup> (406) 329-3425 [jrieck@fs.fed.us](mailto:jrieck@fs.fed.us)

Jessica Haas<sup>2,3</sup> (406) 329-3338 [jrhaas@fs.fed.us](mailto:jrhaas@fs.fed.us)

<sup>1</sup>Lead RAVAR Analyst, RMRS-Missoula (2010)

<sup>2</sup>Specialized RAVAR Tools Technical Lead

<sup>3</sup>NIMO project primary-support

<sup>4</sup>RAVAR training webinar presenter

# RAVAR CHECKLIST

## Confirm RAVAR Request and Assess Situation

Go to [Confirm](#)

On receipt of RAVAR request notification:

1. Access incident information on WFDSS,
2. Contact requester to scope major concerns and issues of fire and confirm RAVAR response timeline, and values-at-risk
3. Confirm counties potentially threatened by the fire → USGS request?
4. Consult other information sources

## Prepare and Collect Incident Data for RAVAR Analysis

Go to [Prepare](#)

1. Set-up working directory and map templates
2. Collect incident specific data ([Pg 16](#))
  - a. ICS-209 from FAM-WEB
  - b. FSPro information and data from WFDSS
  - c. MODIS Hotspot (or local IR)

## Create RAVAR CRITICAL INFRASTRUCTURE Map (ArcGIS)

Go to [Create](#)

1. Rename the ArcGIS Map Template
2. Repair Broken Data Sources
3. Repair FSPro polygon geometry
4. Focus Map on Area of Concern
5. Download Elevation Data
6. Re-source building cluster data
7. Reset MODIS Data and Legend
8. Remove Layers Beyond Extent
9. Modify Jurisdiction Legend
10. Modify Map Text and Legend
11. Identify Water Resources Downstream
12. Re-project Map to Align to N-S
13. Export Draft Map

## Conduct Initial Visual Assessment: What is significant?

Go to [Visual](#)

## Run RAVAR Tool to summarize important Values-at-Risk (VAR)

Go to [Run Tool](#)

## Import summary VAR data to report and complete written analysis

Go to [Import](#)

## Have RAVAR Map and Report reviewed

## Finalize Map and Report, export to \*.pdf

## Post RAVAR product and notify requestors (Pg 30)

Go to [Post](#)

# RAVAR REVIEWER CHECKLIST

Usually takes 5-10 minutes

## Map Review

- Correct fire name & state
- Dates and codes correspond to dates and codes on report document
- Updated map legend area (all relevant text colored black)
- Jurisdictions not present on map are removed from legend
- Appropriate disclaimers remain, in black (i.e. Building Clusters/USGS Structures)
- Author contact information is updated and correct
- Scale bar is 'pretty' and scale set to at least 10 miles (i.e. 10 or 20 miles, not 11.5)
- Map Resolution scale is a 'pretty' number, rounded to nearest 5,000 or 10,000 with a minimum scale of 1:30,000. (ensures a smaller fire still appears small)
  - Don't zoom-in too far; we want map-readers to get a picture of the surrounding area (big picture)
- Quick overview of map proper, looking for major values that should appear in report document
- Spot check a few distances mentioned in report to confirm accuracy
- Projection can be altered to reflect audience (i.e. R5 prefers the California Teale Albers projection)

## Report Document Review

- Overview Issues**
  - File properly renamed and correct name appears in footer on each page
  - Report sections are completely on one page (no hanging categories); i.e. no category title on one page with the bullets underneath it on the next page
  - \*\*\*Report continues on next page\*\*\***, in bold, on all but the last page (**END OF REPORT**)
- Header Table**
  - All fields are updated (no text left in blue except email addresses)
  - Dates and codes correspond to dates and codes on map

## □ General Assessment section

- Description of fire location is accurate and clear (including at least one on-map reference)
- Description of fire spread matches FSPro image on map
- Value listed first, **distance** and **direction** text is bolded; all refer to FSPro extent or lack there-of; i.e. Black Butte Lookout is located <1 mile **W** of mapped fire perimeter within the 60-80% FSPro fire spread probability zone.
- Use terms such as “mapped fire perimeter”, NOT ‘current fire perimeter’, because we don’t usually know how ‘current’ it is; Assume all distances are approximate values, never use the word approximate in report.
- Distances under 1-mile should be described as <1 mile; other distances should be rounded to the nearest mile or ½-mile
- ensure all major values on map are described in document
- “*none identified per available data*” left in document only where statement is true (and converted to black text)
- Source is listed in “Other resources threatened” section when the source is not RAVAR data. (specifically mention ICS-209 values not included in RAVAR data)

## □ Summary tables

- BBB tables -> Big, Bright, and Beautiful tables
- Tables are labeled and not broken up onto two pages (Ctrl-return forces a new page in Microsoft Word)
- Does jurisdiction acreage sum to the same value as county acreage (within 1% because we don’t tabulate water)?
- Structures:
  - Do the multiple county acreages sum to the total county acreage value?
  - Does the combined county table appear first, followed by the individual county’s structure counts?
  - Does the structure value description accurately reflect the county’s average housing value and is the text converted to black?
  - Has the ‘Expected Structures Threatened’ value been filled in and colored black? (if <100 round to the nearest tenth, if >100 round to the nearest one place)
  - If no ‘Other Landmarks’ are present for a given spread probability zone, is “*none identified per available data*” listed for that zone in the table?

## FULL (TWO-PART) LEGEND

 F SPro Fire Perimeter

 F SPro Barriers

### MODIS Points

 18 Oct 2008

 17 Oct 2008

 Previous 6 days

 Past Fires 2001-2009

 CA Past Fires 1996-2009

### F SPro Fire Spread Probabilities

 > 80 %

 60 - 80 %

 40 - 60 %

 20 - 40%

 5 - 20 %

 1 - 5 %

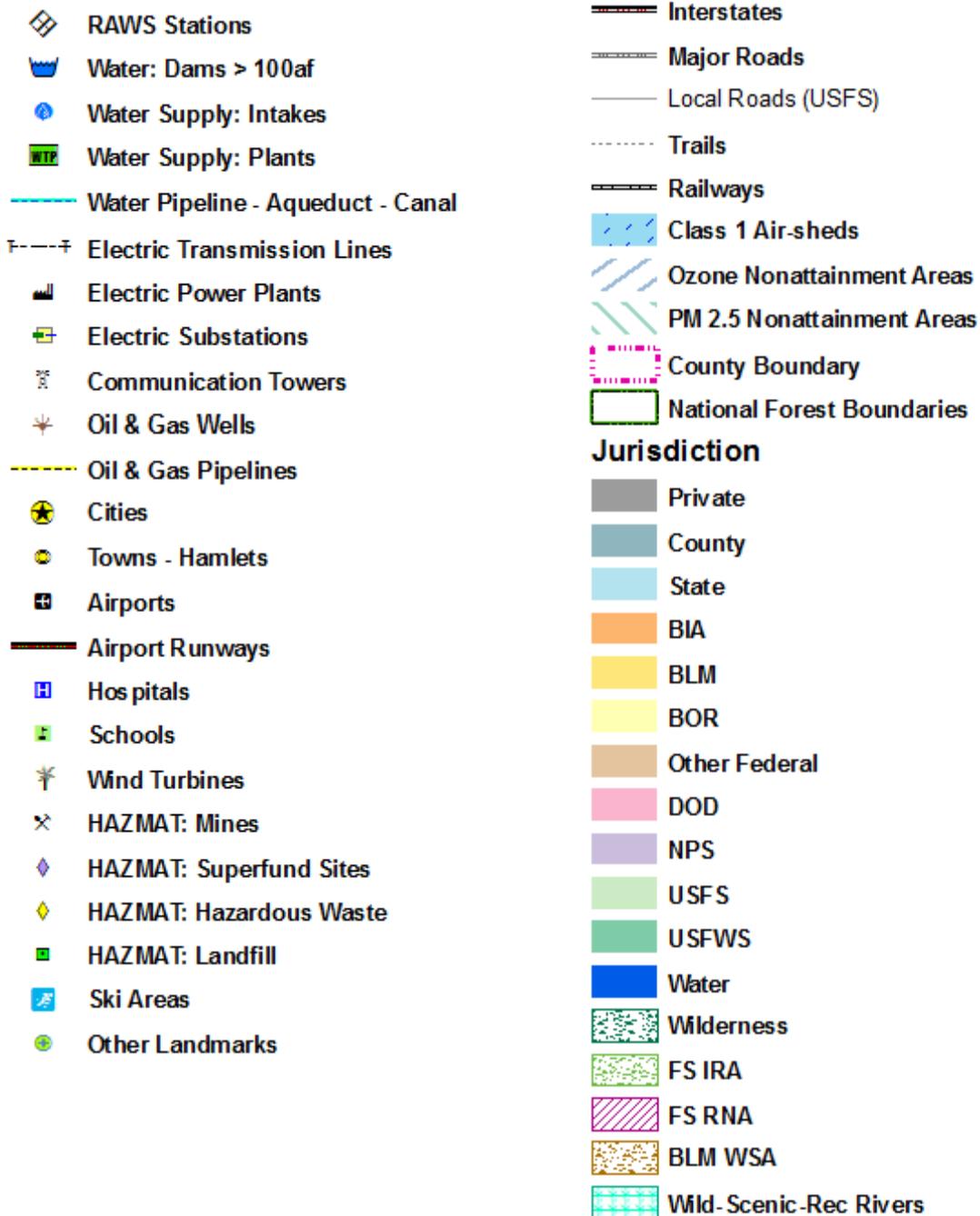
 < 1 %

 Building Clusters: <county name>\*

 USFS Structures

 NPS Structures

 BLM Structures



## NOTES

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